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Table of Contents.

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ORIGINAL ARTICLES— Page.
Coordination of Medical Services in War, by S. R. Burston, C.B., C.B.E., D.S.O., V.D., M.B., B.S., F.R.C.P., F.R.A.C.P., K.H.P. .. 37
The Prostate: Some Commonly Disregarded Principles and Precepts, by W. John Close .. 41
Nitrogen Mustard: The Use in South Australia of Methyl Bis(β Chloroethyl) Amine, by John Mayo, M.D., F.R.C.S., F.R.A.C.S. .. 47
"Dead Space" in Closed Circuit Anæsthetic Apparatus: A Circuit Absorption Unit of Modified Design, by Douglas G. Renton, M.B., B.S., D.A. .. 51
Roseola Infantum (Exanthema Subitum), by D. C. Jackson, D.S.C., M.B., B.S., D.C.H. .. 52

REPORTS OF CASES—
Report of a Case of Tuberculous Meningitis Treated with Streptomycin, by I. S. Booth .. 55
Arrhenoblastoma of the Right Ovary, by Philip C. Thomas, M.R.C.O.G. .. 57
Accidental Air Embolism in a Blood Donor, by K. Melville Kelly .. 58

REVIEWS—
Cancer of the Œsophagus .. 58
A Year Book of Therapeutics .. 59
Practical Orthoptics in the Treatment of Squint .. 59
A Year Book of General Medicine .. 59
Child Health and Disease .. 59
Pædiatrics .. 60
Bronchiogenic Carcinoma and Adenoma .. 60
Human Biochemistry .. 60

LEADING ARTICLES—
The Disabled Worker in Industry .. 61

CURRENT COMMENT—
Tetraethylammonium Chloride: Some Warnings .. 62
Cough in Cardio-Vascular Disease .. 63
Chloroquine and Hepatic Amœbiasis .. 63

ABSTRACTS FROM MEDICAL LITERATURE— Page.
Physiology .. 64
Biochemistry .. 65
Medicine .. 65

BRITISH MEDICAL ASSOCIATION NEWS—
Scientific .. 66

CORRESPONDENCE—
The Pharmaceutical Benefits Act .. 67
Some Aspects of Nutrition as Related to the Practice of Obstetrics and Gynæcology .. 67
A National Health Service .. 67
Coronary Occlusion .. 68

NAVAL, MILITARY AND AIR FORCE—
Appointments .. 68

THE ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS—
Eleventh Annual Meeting .. 69

OBITUARY—
Crawford Henry Mollison .. 69

DISEASES NOTIFIABLE IN EACH STATE AND TERRITORY OF AUSTRALIA .. 71

POST-GRADUATE WORK—
Seminars at Royal Prince Alfred Hospital .. 72

NOMINATIONS AND ELECTIONS .. 72

MEDICAL APPOINTMENTS .. 72

AUSTRALIAN MEDICAL BOARD PROCEEDINGS—
Queensland .. 72
Tasmania .. 72

DIARY FOR THE MONTH .. 72

MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 72

EDITORIAL NOTICES .. 72

COORDINATION OF MEDICAL SERVICES IN WAR.[1]

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GENTLEMEN, I desire to express to you my deep appreciation of the honour that has been conferred upon me in appointing me president of this section.

We have recently emerged victorious from the greatest war the world has known. How well Australia played her part may be gauged by the fact that at one time she had 13% of her total population mobilized in the fighting forces—an achievement which, I understand, was greater than that of any other country on the Allied side—and at the same time she put up an effort in production that was a not inconsiderable factor in the victorious outcome of the war.

That this placed a tremendous strain on the medical services of the country is obvious, especially when one considers that the peak strength of the Australian Army Medical Service alone was little short of 33,000, including 2300 medical officers and 3500 nurses. At the same time a provision of nearly 35,000 hospital beds and accommodation for over 10,000 in convalescent depots was necessary. The medical services of the Navy and the Royal Australian Air Force, though much smaller, were, of necessity, very considerable.

Australia's effort to coordinate and conserve its medical services to meet this emergency was, on the whole, very successful in the recent war, and made it possible for us to maintain a somewhat restricted, but adequate and efficient, medical service to the civil community in all essentials. At the same time the fighting forces were provided with medical services which, for initiative, efficiency and achievement, ranked in the forefront of the medical services of the allied side, with the result that Australian prestige has never stood higher in the medical world than it does today.

I feel it is appropriate that, at this first Congress after six years of war, we should review the measures taken to coordinate and conserve the medical resources of the country and consider how the existing organization may be improved to provide the maximum of efficiency in any future national emergency.

These measures may be best considered under three headings:

1. Coordination of the civil medical services and between them and the medical services of the fighting forces.
2. Coordination between the medical services of the Navy, Army and Air Force.
3. Conservation of medical manpower within the services.

Coordination of the Civil Medical Services and between Them and the Medical Services of the Fighting Forces.

It became apparent after the 1914–1918 war that, if any future major war occurred, its impact would be total on the countries involved, and that the effort required in war production and essential industry consequent on provision and maintenance, on an unprecedented scale, of the fighting forces of a country, would necessitate maximum efficiency in the coordination and control of its manpower.

After the first World War it was realized by many in the medical profession that this situation would put a tremendous strain on our medical resources in both personnel and material, and that it was essential that

[1] President's address delivered before the Section of Naval, Military and Air Force Medicine and Surgery, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

plans should be carefully prepared in peacetime that could be implemented immediately on the outbreak of war, to coordinate, control and conserve the medical manpower and medical supplies of the country.

This matter was first brought prominently before the profession by Major-General (then Colonel) F. A. Maguire in a paper read before this section of the Congress in January, 1934, at Hobart. In his paper he outlined an organization for the medical services in war, under a director-general, with appropriate technical advisers, responsible to War Cabinet for the broad administration of the whole of the medical services of the country, civil and military, in time of war, and to advise on all matters of high medical policy.

However, prior to this Major-General G. W. Barber, whilst Director-General of Medical Services of the Australian Military Forces, prepared a plan and subsequently submitted a report on the coordination and control of the medical services in war. On his retirement this plan, with certain alterations, was pressed by his successor, the late Major-General R. M. Downes, and in 1938 it was accepted and included in the War Book.

The plan laid down that a committee should be set up to control and coordinate the medical arrangements in respect of civil, naval, military and air force requirements in time of war. The committee, in time of peace, was to be a standing committee to collect medical data on personnel and material and to plan for the coordination of the medical services in war. In time of war it was to merge into a central executive medical committee to coordinate and control the supply and distribution of medical personnel to the fighting services and the civil community, to coordinate and control the procurement, supply and distribution of medical equipment for the services and civil community, and to ensure adequate provision of hospital accommodation for the civil community.

The committee, as originally constituted, comprised representatives of the Navy and Army Medical Services, the Commonwealth Department of Health and the British Medical Association. The committee met for the first time on July 13, 1938. Among other things, it recommended that a survey should be made of the medical profession in Australia, the hospital accommodation and the medical equipment. It also recommended that regulations should be drafted to give the committee necessary powers to make provision for the supply and distribution of medical personnel for the Naval, Military and Air Forces of the Commonwealth and the civil population, and to provide for the issue of instructions by the Chairman of the Central Committee, acting on behalf of that committee, requiring medical personnel to practise or place their services at the disposal of the Commonwealth in specified places for such periods as were named in the directions. These regulations were to be made under a national security act. That Act was finally enacted twelve months later, on September 9, 1939. The term "medical personnel" was to include medical practitioners, medical students, dentists, pharmacists, trained nurses, masseurs and masseuses.

The original National Security (Medical Coordination and Equipment) Regulations were made on December 19, 1939, under Statutory Rules 178 and they were amended from time to time.

Under those regulations, and their succeeding amendments, efforts were made to provide the doctors and equipment necessary to meet the needs of Australia—defence and civil. The regulations provided for a Central Medical Coordination Committee, of which the Director-General of Medical Services (Army) was chairman, and State Medical Coordination Committees, of which the Deputy Directors of Medical Services (Army) in each State were chairmen. The Central Committee consisted of the Director of Naval Medical Services, the Director-General of Medical Services of the Australian Military Forces, the Director-General of Medical Services of the Royal Australian Air Force, the Director-General of the Commonwealth Department of Health, a representative of the Adjutant-General, representatives of the British Medical Association, one member representing the Royal Australasian Colleges of Physicians and Surgeons, and a representative of the Minister administering the regulations, whose function was to watch the interests of the civil community. There was also a senior member of the medical profession appointed to the committee as executive officer.

The State committees were similarly constituted, except that for the Directors-General of the Medical Services of the Forces they included their deputies. The Chairman of the Central Committee, acting on the recommendation of that committee, could appoint sub-committees to assist the Central Committee and State committees. The functions of the Central Committee were to provide and distribute, in accordance with the regulations, medical personnel for the Navy, Army, Air Force and civil population, and to provide hospital accommodation, equipment and staff to meet any emergency arising out of the war. The Medical Equipment Control Committee was formed as a committee of the Central Medical Coordination Committee and was entrusted with the task of coordinating the production and procurement of medical supplies and equipment and its allocation to the services and civil community. For the history of the great achievements of this committee I refer you to the Stawell Oration, delivered by its chairman, Sir Alan Newton, in 1947.

The Central Committee was also charged with the responsibility of giving directions and exercising general supervision over State committees. The State committees exercised such powers and performed such functions in relation to medical personnel, medical equipment, hospital accommodation, hospital equipment and hospital staffs as were delegated to or conferred on them by or under the regulations. They also were required to submit reports and make recommendations to the Central Committee on matters relevant to the purpose for which they were appointed, and through the Central Committee, to the Medical Equipment Control Committee and the Director-General of the Emergency Medical Services.

As a result of a recommendation of the Central Committee, power was given in 1941, under the regulations, for the Governor-General, if it appeared necessary in the interest of public safety and the defence of the Commonwealth, by proclamation to call upon all medical practitioners under sixty years of age, other than those employed in the fighting services, to serve as medical officers in the Citizens' Forces. The proclamation giving effect to this provision was issued on January 1, 1942. Three months later, on March 26, 1942, on the recommendation of the Committee, this power was extended to service in the Emergency Civil Medical Practitioner Service. Thus, the medical profession became the first section of the community to become conscripted.

However, early in 1941 the medical profession had decided to put themselves in the hands of the Coordination Committee and to leave it to that committee to decide who should be called up into the services and who should remain in civil practice. Thus, realizing the importance of a proper coordination of the medical manpower of the community, they voluntarily subjected themselves to conscription practically twelve months before any other section of the community, and many months before the Government, at their request, officially proclaimed conscription for medical practitioners.

On the recommendation of the Central Committee, the Minister appointed a member of that committee Director-General of Emergency Medical Service, and he was empowered to give directions concerning this service to the State Medical Coordination Committees.

When enrolled in this service, medical practitioners could be required to perform medical service for members of the civil population as specified by the Director-General of the Emergency Medical Service. The majority of medical practitioners under sixty years of age were enrolled in this service, but, happily, the vast majority of them were only required to continue in their normal civil place and manner of practice. However, it was necessary, in a very few cases, to direct members of the Emergency Medical Service to practise their profession in localities other than their normal place of practice,

sometimes outside the boundaries of the State in which they were registered.

In order to make this legally possible it was provided by regulation that a member of the Emergency Medical Service was entitled to practise as a legally qualified medical practitioner in any State or territory in which he was required to serve, notwithstanding that he had not complied with the requirements of the State or territory relating to the registration of medical practitioners.

A satisfactory scale of pay and allowance was provided for this service, together with arrangements for recreational and sick leave.

It was early seen that, even though every doctor under sixty years of age in Australia was liable for service either in the forces or in the Emergency Medical Service, as the war progressed there would be insufficient doctors to meet demands which were becoming more and more pressing. The Central Committee, therefore, was forced to approach the medical faculties of the universities with a request that they shorten the time for graduation. The aim was, by concentration and compression of the course, to supply in three years the number of graduates which, normally would have been available in four years.

Medical coordination was originally part of the system of defence coordination and the National Security (Medical Co-ordination and Equipment) Regulations were administered by the Minister of State for Defence. This was a logical and satisfactory administrative arrangement. In 1943, however, in spite of a strong protest from the Committee, the administration was transferred to the Minister for Health. The Committee accordingly became a committee of the Commonwealth Department of Health. Knowing that the Government was pledged to the introduction of a national health service, the profession naturally was apprehensive of the change. The Committee had in its possession intimate records of the profession throughout Australia, and these records, without warning, had become part of the archives of the Commonwealth department which would sponsor and control the Government's national health service—a form of service to which it was known a large majority of the profession was opposed.

Coordination between the Services.

Coordination between the services was effected through a committee known as the Standing Committee of Services Medical Directors, established in 1940. Its functions were advisory and consultative: to advise the Minister of Defence Coordination on the coordination of the administration and organization of the medical services of the navy, army and air force, and the maintenance of a consistent policy for directing common action in the medical services of the defence forces, and to investigate and report upon any question of medical policy or principle having a joint services aspect and any matter requiring coordination between the three services or affecting more than one service, which might be referred to the Committee by the Minister administering the Department of Defence Coordination or any of the other service departments. The Committee was also required to bring to the notice of the Minister of Defence Coordination, by way of report, any matter on which it considered the Minister should be informed. The Committee was constituted to consist of the Director of Naval Medical Services, the Director-General of the Army Medical Services and the Director of the Air Medical Services. Afterwards, the Director of Air Medical Services became the Director-General of Air Medical Services. The senior officer of the Committee, the Director-General of Army Medical Services, was chairman. The executive officer of the Central Medical Coordination Committee and the deputy chairman of the Medical Equipment Control Committee were coopted to this committee. All reports of the Committee were forwarded to the Minister through the Secretary of the Department of Defence Coordination and any decision of the Minister on any matter he had been advised upon by the Committee was communicated back to the Secretary of the Committee and the Departments of Navy, Army and Air by the Secretary of the Department of Defence Coordination.

The Committee met at least once a month and its activities covered any and every interest of the medical departments of the services: personnel, hospital provision and maintenance, medical equipment, transport by air, land and sea of sick and wounded, hygiene, malaria control and the control of venereal diseases—in fact, anything to do with the health and physical welfare of members of the services, prisoners of war and civilian communities coming under military authority or control.

When problems arose in which the medical services of the Allied forces were interested, medical officers of these forces were coopted to the Committee.

On the recommendation of the Central Medical Coordination Committee, the Standing Committee of Services Medical Directors obtained authority for the Medical Directors of the Navy, Army and Air Force, whenever possible, to detail medical officers to act as *locum tenentes* for civil medical practitioners who, through either illness or other causes, were temporarily unable to carry on their practice. In this way, particularly during periods of operational inactivity, a very large number of civil practitioners were provided with a *locum tenens*. In addition, in a large number of cases service medical officers carried out temporary duty as reliefs in civil hospitals.

Also, on the recommendation of this Committee, committees were set up in each State of the Commonwealth to coordinate and control the measures necessary to prevent the spread of venereal disease, particularly in the capital cities and large seaport towns. These committees consisted of representatives of the medical directors of the services, the United States Medical Corps, the State health authority and the Commissioner of Police. The measures taken on the recommendation of these committees were to a great extent responsible for the comparatively small increase in the venereal disease rate in the civil population.

Finally, the plan adopted for the medical arrangements for the demobilization of the forces was one developed by the Standing Committee of Services Medical Directors in conjunction with the Chief Medical Officer of the Repatriation Commission. This was probably the most completely coordinated plan that the medical services achieved, worked without any hitch from beginning to end, and was a most important factor in ensuring smooth and rapid demobilization.

Conservation of Medical Manpower within the Services.

Early in 1942, when it became apparent that the supply of medical officers and, in fact, that the medical manpower of the country generally would not be sufficient adequately to fill the medical establishments of the services without undue depletion of the medical services to the civil community, the Director-General of Medical Services of the Australian Military Forces made a very thorough examination of the establishments of the army medical services with a view to obtaining the maximum conservation of medical manpower, with the result that, in the latter part of that year, on the recommendation of the Director-General of Medical Services, the Commander-in-Chief gave authority for the following measures to be implemented in the Australian Military Forces:

1. Amendments to the establishment of the Australian Army Medical Corps to effect the replacement of medical officers by non-medical officers in appointments such as registrars of hospitals, bearer officers in field ambulances, certain hygiene officers and administrative appointments *et cetera*.

2. Training of selected medical officers in order that they would qualify for appointment as physicians, surgeons, psychiatrists, pathologists, ophthalmologists, radiologists, hygienists, in fact in every specialty that was provided for in the army. Under this policy a large number of medical officers were trained and enabled to obtain their senior qualifications in the remaining years of the war.

3. Training of technicians such as radiographers and laboratory assistants.

As a result of these measures the establishment of medical officers in the army was immediately reduced by over 200, and the army also gradually became self-supporting in specialists and medical technicians. Not only did this ease the situation in the civil medical services, but as the war progressed it became possible to augment the specialist service to the civil community by the demobilization of a considerable number of senior specialists, whose place in the army was taken by the young medical officers trained under this policy. Similar action was taken in the Royal Australian Navy and the Royal Australian Air Force.

Ultimately, on the demobilization of the forces, the number of well-trained specialists and medical technicians who became available to the civil community from the services was sufficient adequately to fill the gap that would have otherwise resulted from six years' interruption of post-graduate training.

Comments.

From what I have said you will realize that a very real effort was made to coordinate and conserve the medical manpower of the country, but in my position as Director-General of Medical Services of the Army and Chairman of the Central Medical Coordination Committee, I became aware of certain faults in our set-up and failures in our efforts, which should be corrected if we are to achieve the desired efficiency in any future national emergency. It is to these faults and difficulties that I would now direct your attention.

I think that the set-up and scope of the functions of the Central Medical Coordination Committee and State committees, with the executive authority that was envisaged in the original plan, leave little room for improvement, but, unfortunately, the Central Coordination Committee did not commence to function fully until some months after the declaration of war. This resulted, in the first few months, in a more or less haphazard selection of medical officers from amongst the doctors volunteering for service and, consequently, an unnecessary number of senior specialists were appointed to the general hospitals and other medical units of the Australian Imperial Force. In fact, the specialist staff of most of the general hospitals of the Australian Imperial Force was chiefly composed of physicians and surgeons holding appointments on the honorary staffs of teaching hospitals. This was fortunate for the Australian Imperial Force, but most unfortunate for the medical schools. I am in entire agreement with Brigadier W. A. Hailes, late Director of Surgery on the Medical Directorate of Australian Army Headquarters, who, in his Syme Oration, delivered before the Victorian Branch of the British Medical Association on August 6, 1947, stated that it was necessary to appoint only one physician and one surgeon of senior specialist rank to an army general hospital, and that selected young officers should be trained from the outset by those seniors to fill the establishment of medical and surgical specialists. The other chief weakness in the coordination set-up was the fact that the Government never granted the Central Committee the executive authority that was essential to its task. In consequence, in order to take action against a medical practitioner who disobeyed its instructions, it was necessary for the Committee first to obtain the agreement of the Director-General of Manpower, who then had to obtain the consent of the Attorney-General before any legal action could be started. You can realize the difficulties and delays in such a procedure. The practical result was that, as most of the instances in which the Committee desired to take action were in relation to some emergency, the emergency, of necessity, had been dealt with in some other way weeks before any legal action could possibly be initiated. Until the State committees became fully aware of these difficulties there was a strong feeling of resentment at what they considered to be the failure of the Central Committee to support them.

The success of the Central Committee in carrying out its difficult task was, to the greatest extent, due to the loyal cooperation of the vast majority of the medical profession, and, as Chairman of the Committee for the five most difficult years of its work, I should like to take this opportunity of expressing our great appreciation of the manner in which the medical profession supported us.

It is essential that these faults and others should be rectified before another national emergency occurs, and for this reason I am most strongly of the opinion that the Commonwealth Government should lose no time in appointing a strongly constituted committee to examine thoroughly the present medical coordination set-up and to advise the Government on the steps that should be taken now to ensure that the Central Medical Coordination Committee is enabled to take over the task of controlling and coordinating the medical services of the country, with full executive authority, immediately on the outbreak of war. I suggest that the three medical directors of the services, two medical members of the late Central Medical Coordination Committee and a senior representative of the Department of Defence Coordination should be included in the personnel of such a committee. This committee should have full access to all past records of the Central Medical Coordination Committee and, in addition, the fullest information on the possible impact of new methods of warfare on the civil population of Australia, as it may be necessary in any future set-up to include plans for dealing with large numbers of civilian casualties.

There was a very considerable volume of criticism during the war, to a large extent uninformed, of what was alleged to be the extravagant establishments of the medical services of the armed forces and the unnecessary duplication of effort consequent on there being three entirely separate and distinct medical services. This criticism was much more persistent in the United Kingdom than in this country, and eventually, in the United Kingdom, the amalgamation of the three medical services was seriously advocated in both Houses of Parliament.

I am convinced that, at least under present conditions, this is not a practical possibility, and so long as the three services remain the responsibility of three separate Ministers of senior Cabinet rank, it will remain an impossibility.

There would be many other difficulties to be overcome in effecting such an amalgamation, but the time at my disposal does not permit me to discuss them. They include such important factors as the morale of the services, the responsibilities of commanders and the entirely different training required by the medical services of the field formation of the Army as compared to the other services.

However, I do consider that it is most important that the situation be thoroughly examined to determine the maximum degree of coordination that can be achieved in any future war. I hope that the Medical Directors have this matter well in hand.

As a result of my experience I am convinced that there could be a considerable saving of medical manpower if the services were prepared to amalgamate their medical resources in certain aspects of their responsibilities. I refer particularly to hospital facilities at the base, on the lines of communication, and at forward bases.

Individual planning for hospital facilities in these areas inevitably leads to some degree of duplication and waste of medical manpower, and I strongly urge that wherever more than one service is to be provided for, it should be done on a common plan, carefully coordinated by the services concerned.

This did occur, to some extent, in the majority of the main base hospitals in the capital cities of Australia, which were for the common use of the three services under the administrative control of the Director-General of Medical Services of the Army, but were staffed by medical officers, nursing sisters, nursing orderlies and ward orderlies of the three services in proportion to the number of beds occupied by members of their respective services. The army provided the staff for all other essential services in the hospital.

However, on taking over as Director-General of Medical Services of the Australian Military Forces, on my return from the Middle East in 1942, I found that at the two

largest hospitals, 113 Australian General Hospital (Concord) and 115 Australian General Hospital (Heidelberg), the Royal Australian Air Force had established their section of the hospital as a definite unit, giving it the status of a Royal Australian Air Force general hospital. This was never intended in the original instructions regarding these hospitals, and I am convinced that this set-up of a unit, with its commanding officer responsible to the head of his own service, within a larger unit of another service, is wrong in principle and in practice leads to discord, administrative difficulties and waste of manpower.

The smooth-running efficiency of these two hospitals depended to a very great extent on the personalities of the commanding officers. Moreover, it is obviously wrong that a commanding officer should be held responsible for the efficient and economic running of a unit over an appreciable section of which he has not full control as regards either staffing or discipline.

Another unnecessary practice resulted from this set-up, namely, that two distinct panels of visiting specialists were appointed to these hospitals. This led to a considerable degree of duplication in specialist visits and a consequent unnecessary waste of the time of the already seriously depleted specialist service to the civil community. I sincrely hope that an administratively unsound set-up of this nature will not be permitted on any future occasion.

There are two other matters to which I wish to direct attention. The first concerns the allocation of medical officers to the services. The Navy and Royal Australian Air Force insisted that only medical officers of A1 medical category, fit for service in field formations, should be enlisted in their services. Consequently, in order to obtain the numbers required to fill its establishments, it was necessary for the army to accept a large number of medical officers who, through age or physical disability, were unfit for service in field formations. These B class medical officers, of necessity, were posted to general hospitals and base and lines of communication units. This reacted most unfairly on the young fit medical officers of the Australian Army Medical Corps. Owing to the scarcity of young A class medical officers in hospitals and other units on the lines of communication or at the base, it was possible to give only a very small percentage of medical officers in field formations a tour of duty in a posting where they could gain clinical experience. This might not matter in a war of short duration, but in one lasting six years it became a very real problem.

Finally, when hostilities cease and demobilization commences, I feel that some arrangement should be made for pooling the medical officers of the services to ensure that they are on the same footing in all services. There was, justly I think, a keen feeling of resentment amongst the medical officers of the army with five years or more of service, whose turn for demobilization had not arrived, when they realized that medical officers of other services were being demobilized after only three years, or less, of service. I know it will be difficult to prevent this from recurring on a future occasion, but I feel most strongly that a real effort should be made to find the solution of this problem on the lines of pooling of the duties of the medical officers of the three services whenever it is possible. After all, when hostilities cease a medical officer's job, in the majority of cases, becomes primarily that of a doctor or a hygienist. It do not think that it is important whether he is clothed in a khaki or blue uniform.

Conclusion.

I regret that, in the time allotted for my address, it has been possible to give you but a brief and somewhat sketchy account of our efforts to coordinate and conserve the medical manpower of the country and to indicate to you the more important faults and weaknesses as I saw them.

I hope, however, that what I have said will stimulate those of you who will be concerned in these matters in the future, to press for the action necessary to enable us to benefit from our recent experiences.

THE PROSTATE: SOME COMMONLY DISREGARDED PRINCIPLES AND PRECEPTS.[1]

By W. JOHN CLOSE,
Adelaide.

MY original paper on prostatic carcinoma was intended for the Australasian Medical Congress of last year, and when it was suggested that I should make it the subject of a Branch discussion I decided to include the various disorders of the prostate which the general practitioner commonly meets, and which force on him the onus of the first decision as to their triviality or otherwise. At the same time you need have no apprehension that a symposium on all the diseases of the prostate will be inflicted on you, but rather a brief discussion on my part of a few points of interest in connexion with the three most common affections, prostatitis, carcinoma, and benign hypertrophy.

I admit that I am opening up a wide field for comment and criticism by other speakers, but that should be all to the good, should time allow.

Prostatitis (Subacute or Chronic).

I am not greatly concerned with the acute inflammations here, since I wish to interest you in the more chronic conditions represented by my other two subjects.

The term should be more strictly "prostato-vesiculitis", since the vesicles are seldom excluded (though I know this is a controversial statement). In a previous paper I have discussed the extent of such involvement.(1)

The first precept I wish to impress upon you is: "No examination of the prostate is complete without a microscopic examination of the prostato-vesicular secretion". This applies to all conditions, and the most useful, and usually the only necessary examination is a consulting room procedure, the examination of the "wet film". When I repeatedly refer to the wet film I mean a fresh drop of the secretion, expressed by prostatic massage, collected on a slide, covered with a slip, and compressed with blotting paper lightly enough to remove excess and give one a film of uniform thickness: this is examined under a comparatively low power, four millimetre objective and 10X eyepiece, compared with the oil immersion lens necessary for the examination of stained smears. The technique is not so much an ignored principle in diagnostic investigation as one that has never been learned. There is little reason for the general practitioner or surgeon to fail to carry out this simple procedure in the consulting room, though I know it is not a usual practice because of the difficulty I have experienced in securing a microscope in the out-patient department, and indeed in the male clinic, when I practised there.

I am ready to admit that in some cases, such as that of the patient in hospital with retention of urine, and that of the very irritable bladder, the procedure is not a practicable one, and one must then be content with the incomplete picture of the condition; but for all that, as a consulting room or out-patient routine it need seldom be forgone, since: (i) the specimen takes only two minutes to prepare and examine—probably little if at all longer than looking for albumin in the urine; (ii) secretion sent to the laboratory dries and crystallizes quickly; (iii) the laboratory cannot supply serial information as to cell clumping; (iv) the immediate treatment may depend on one's findings; and (v) since such films should be examined after each prostatic massage in order to watch progress, it follows that the amount of one's laboratory account would be very high, and possibly not easily collected from the patient.

Dried smears of the secretion, sent to the laboratory to be stained, in my opinion have a very limited value unless the bacteriology is in question, or unless one requires information as to the presence of carcinoma cells. This last adjuvant to diagnosis will be mentioned later.

[1] Read at a meeting of the South Australian Branch of the British Medical Association on March 31, 1949.

Another common method of examination of these secretions is to collect them in a glass of water or urine, and view the deposit through transmitted light, but it is one of the most fallacious methods I know of.

I can hardly go so far in this paper as to describe the variations that occur in the normal and abnormal film; I can only refer you to my previous publication above-mentioned, and reproduce therefrom a few diagrams which will show the almost geometric clumping of cells as they are expressed from the prostatic tubules or ejaculatory ducts (Figure I). In addition to the clumps one usually sees a number of polymorphonuclear leucocytes scattered throughout the fields, often without clumps. The clumping, however, demonstrates more than anything else the necessity for repeated prostatic massage to secure efficient drainage, and this procedure, alone or with other adjuvants to the same end, must be continued till no further clumps are found.

But when such films are spread and stained the clumps are dispersed, the cell numbers are greatly reduced, and the large degenerated cells (containing many basophilic granules, but poorly stained nuclei), which I have learned to regard as vesicular in origin, seem to lose their significance viewed singly.

I am not worrying you with my reasons for calling these cells "vesicular"—they are given at length in the paper already cited; it will be quite sufficient for you to find your polymorphonuclear leucocytes and your clumps in the wet films and so satisfy yourself that infection of the male adnexæ is present.

A patient may present himself to you with the dysuria complex, such as pain, difficulty and frequency; these may represent various pathological processes arising in the prostate gland. The age of the patient may suggest one or the other, but it should be remembered that prostatitis can be present in the elderly organ, while carcinoma may occur in the comparatively young, when it is more likely to be the acute, rapidly growing type. It should also be remembered that prostatic hypertrophy (or carcinoma for that matter) may coexist with prostatitis; the hypertrophy may be obvious, but the inflammation detectable only by the wet film. Treatment of the inflammation associated with hypertrophy will give your patient partial or complete symptomatic relief, according to the degree of hypertrophy.

The wet film is essential not only for the differential diagnosis of these conditions confined to the prostate, but for the differentiation also of prostatic infections from other parts of the urinary tract.

One frequently sees patients who have been treated for recurrent renal conditions (usually "pyelitis") when the wet film would have established the fact that the condition was either entirely or at least primarily prostato-vesicular. The following is a synopsis of a case history, selected not because it is unique, but because, being recent, it is still fresh in mind.

The patient was a man, aged fifty-four years. He first consulted me on October 29, 1947, giving a history, partly supplied by his doctor, of attacks of pain referred to the left loin, accompanied by rise of temperature, shivers, and frequent and painful micturition. Examination of his urine had shown pus and *Escherichia coli*. Tenderness remained in the left side of the abdomen from loin to groin between the attacks. In a recent bout there had been hæmaturia, as well as gross pyuria. He had been treated for over three years and was considered to be suffering from recurrent pyelitis, the causal pathology being unknown. Recent frequent and small bowel actions had suggested colitis or proctitis also. A plain urogram had shown only calcified glands, and an excretion pyelogram had been normal.

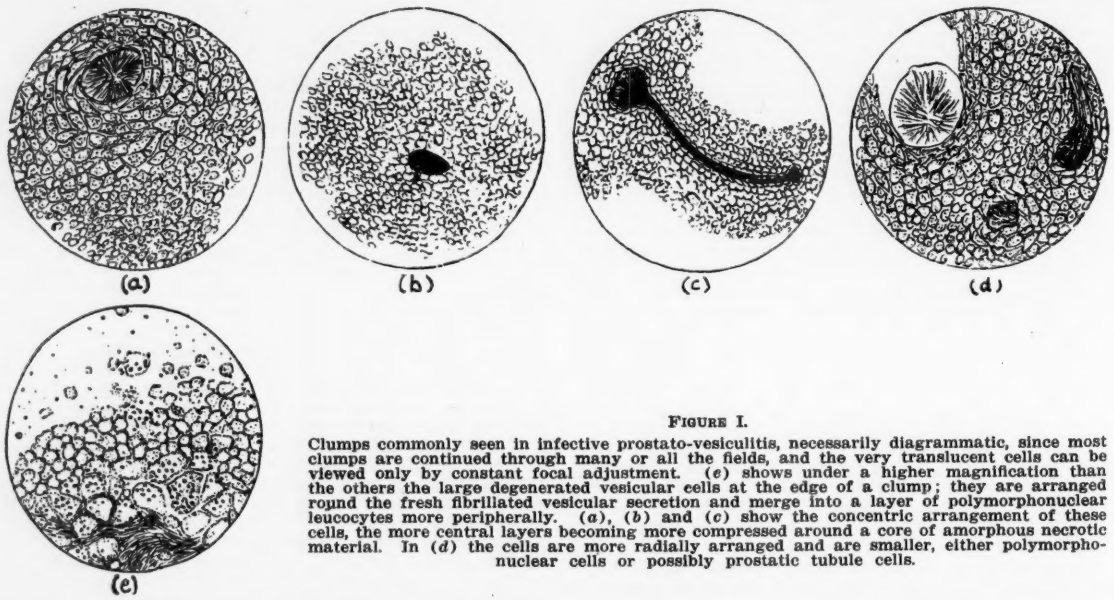

FIGURE I.

Clumps commonly seen in infective prostato-vesiculitis, necessarily diagrammatic, since most clumps are continued through many or all the fields, and the very translucent cells can be viewed only by constant focal adjustment. (*e*) shows under a higher magnification than the others the large degenerated vesicular cells at the edge of a clump; they are arranged round the fresh fibrillated vesicular secretion and merge into a layer of polymorphonuclear leucocytes more peripherally. (*a*), (*b*) and (*c*) show the concentric arrangement of these cells, the more central layers becoming more compressed around a core of amorphous necrotic material. In (*d*) the cells are more radially arranged and are smaller, either polymorphonuclear cells or possibly prostatic tubule cells.

On December 2, 1947, I examined him with the cystoscope and found a small median lobe projection, marked bullous œdema of the trigone, especially of the ureteric bars, and on the left side definite submucous cysts, the largest appearing under the cystoscope's magnification as large as a cherry, and implying chronicity of the trigonal inflammation. Indigo-carmine excretion was equal and satisfactory in time and concentration from each kidney. Examination of catheter specimens from each kidney gave no evidence of infection. Residual urine was practically nil. X-ray examination after a barium enema and proctoscopy showed no abnormality.

On January 8, 1948, rectal examination showed no abnormality in prostate or vesicles, the latter being impalpable. The prostate and vesicles were massaged; the secretion obtained was to the naked eye frank pus, and examination of the wet film showed numerous pus cells and clumping of epithelial cells that indicated to me vesicular involvement.

After appropriate local treatment, combined with chemotherapy, on March 8, 1948, examination of a wet film showed no cells.

When he was last seen on December 2, 1948, he had had no further attacks, and microscopically his wet film was normal.

Considering that for years this patient had been subjected to sulphonamides, mandelic acid, and penicillin, I am convinced that the local treatment to the prostate

and vesicles was responsible for the apparently permanent cure.

The conclusion then was that the chronic infection of his prostate and vesicles, suggested in the first place by the chronic œdema of the trigone found per cystoscope, and confirmed by the wet film, was the primary condition, if not the whole pathological picture. Ascending infection may have occurred from time to time to the left kidney, but an acute flare-up in the vesicles alone could have easily caused all the symptoms simulating renal irritation. The diarrhœa was no doubt explained by the proximity of the acutely inflamed vesicles to the rectum.

Conversely, a patient considered to be suffering from prostatitis may often be found through a "negative" wet film finding to be suffering from infection in the higher parts of the urinary tract. In the male clinic, where genital infections only are treated, it is not unusual to come across men originally presumed to be prostatitis sufferers, but in whose case the examination of the wet film has served to direct one's attention higher. I have seen there such conditions as bladder diverticula, pyonephrosis, renal calculi and renal tuberculosis, diagnosed primarily by ruling out the prostate and vesicles as a cause of the symptoms. Dr. Isenstein, I am sure, will corroborate this statement.

Furthermore, testicular swellings will frequently give rise to some doubt as to diagnosis. A subacute or chronic epididymitis may be quite apparent when one can distinguish the hard tender epididymis, but some of the doubts I have occasionally had in mind were as follows. Is it epididymitis, tumour, gumma or torsion of either the testis or one of its cystic appendages? Since epididymitis seldom exists without a pre-existing vesiculitis, massage of the prostate and vesicles will almost invariably give one evidence in the wet film of vesicular involvement. Usually clumps, or packing of the microscopic field with the large degenerated vesicular cells, can be found.

In brief, I am at a loss to know how accurate preoperative diagnosis can be made without more frequent recourse to the wet film.

I am loath to leave this section of my paper without reference to the obscure pathology of Reiter's disease. I do not wish to be dogmatic since my cases have been few, but I should like to direct the attention of other investigators to the seminal vesicles. I should not be surprised if they were found to be the latent source of infection; just look at a wet film in your next case.

Prostatic Carcinoma.

The principle I wish to belabour here is one that applies to malignant neoplasms anywhere in the body: "Early recognition of a carcinoma is necessary for its eradication."

We medical men, and the public as well, are acting upon it in conditions such as cancer of the breast, uterus, and gastro-intestinal tract, though, as the Cancer Committee keeps reminding us, there is still much to be desired. In the case of prostatic carcinoma I believe the precept is almost universally ignored.

The hopeless outlook of this neoplasm has so obscured the detective enterprise of the profession that the innovation of endocrine therapy has suddenly appeared in the darkness as a light at the window; and although we now know it to have failed us as a life-saver, we gain comfort from it still, much as a departing soul receives the solace of extreme unction when persuaded of the inevitable termination of his temporal existence.

Whilst paying tribute to the epochal work of Huggins and Hodges[12] on the endocrine treatment of prostatic carcinoma, I venture to state paradoxically that in this part of the world at least, this beneficent discovery has retarded rather than advanced progress in treatment in the early cases.

I should like to retrieve the operable carcinoma, which, forgetting its sex, one might term the "Cinderella cancer" from the ashes of neglect. If discovered early enough it is by no means hopeless—the fatal termination is by no means inevitable. Cure by operation is possible in 50% of cases.[8][17]

Endocrine therapy, whether it is positive, by the administration of œstrogen, or negative, by orchiectomy or testicular irradiation, has probably in the majority of cases not greatly prolonged life, though admittedly symptoms have been greatly, but temporarily, relieved. Beatty,[3] in a study of the life-expectation in these cases, stated that patients who had died lived for an average of 2·73 years, and those still living had so far survived two years only.

But such was the early enthusiasm for endocrine therapy that papers by Edwards[9] and Ham[10] at Sydney in 1945 evoked only one mention of the radical operation in the papers and discussion as reported; Edwards then suggested that radical operation might be tried if hormones failed.

The onus is on general practitioner and surgeon equally to find the early cases and to give his patients the chance of radical cure, rather than to start them off on time-wasting palliation. Naturally the man in the street must be educated also to respect the trivial signs of frequency, irritation and straining on micturition. With the usual amount of good luck and/or divine cooperation 50% will be successfully treated.

I have recently perused the case notes of 227 patients admitted to the Royal Adelaide Hospital for prostatic carcinoma over a ten-year period (1939 to 1948). It was the most depressing literature I had ever read; far too many patients came in with the distressing symptoms due to metastases after long-continued palliation elsewhere. In very few instances did it appear that the condition on admission was in an early enough stage to warrant radical methods. I can vouch for two cases only, because they happened to be my own. The story is a dismal serial without an ending.

It is all the greater pity because prostatic carcinoma is one of the commonest of carcinomata in males, and most patients are summarily condemned because of the pessimistic outlook.

Here are a few statistics as to its incidence.

TABLE I.

The Incidence of Carcinomata in Certain Sites.

From the Statistical Register of the State of South Australia.

Site.	Average Male Deaths per Year from Commonest Carcinomata over Ten-year Period.	Percentage of Total Deaths from all Carcinomata over Three-year Period 1943–45.
Stomach and duodenum ..	91	23·25
Prostate	50	10·07
Rectum	25	7·16
Mouth and pharynx ..	27	5·45

From the Registrar-General of Great Britain.

Site.	Percentage of Total Deaths from All Carcinomata over Ten-year Period 1931–1940.	Proportion in each Million Male Deaths from all Causes.	
		1931–35.	1936–40.
Stomach	23	228·6	230·7
Intestine (including rectum)	13·5	131·6	137·4
Lung	8·8	107·7	108·2
Prostate	5·8	66·4	102·2
Œsophagus	5·5	55·0	61·2

The Royal Adelaide Hospital post-mortem records of 5000 cases[5] give remarkably similar results to those of the Registrar-General (Great Britain), but as Professor J. B. Cleland says, the greater number pass away at Northfield or elsewhere now, so that the figures are not a good

indication of relative incidence. He adds: "A definite increase in the incidence of carcinoma of the prostate seems to have been observed during the last 1000 post mortems, perhaps to be attributed to the increasing age of the population. There is an unquestionable increase in carcinoma of the lung". Note also the doubling of the figure for the prostate in the latter five years of the Registrar General's statistics.

If anyone were to take the trouble to check my local figures from the State's statistical register he would find prostatic carcinoma included among the figures for genital carcinomata, but the Government Statistician has informed me that in 1947 94% of these genital conditions were prostatic. Therefore, I have, legitimately I believe, made a general estimate from that proportion.

The incidence is, however, even higher than these figures indicate, since there is a type that frequently remains dormant for a long while, ten years or more, and from which the affected person may not die. I could bore you with many more statistics to uphold this statement, but let it suffice to say that pathologists in America, Great Britain, and Viennese hospitals quote figures from unselected autopsies (deaths from all causes) of occult prostatic carcinomata ranging from 13% to 21%. Some go much higher, but to avoid over-estimation, let us stick to the average of 17% here given. At the Royal Adelaide Hospital Professor Cleland's figures are not so high, possibly because serial sections cannot be made of all organs owing to staff limitations.

These indolent types of cancer are very slow in growing and metastasizing, an indolence that we see in relation to no other organ, even the female breast, and are usually to be found in the elderly, no doubt inhibited by the involution of the androgen-producing glands. They do not find a place within my criteria for radical operation unless they have produced symptoms of activity. It is possible that they may be suspected during life by routine rectal examination, though I cannot recall ever having found one myself that did not appear to be active.

Then how is one to find the early carcinoma in a fit state for radical operation?

First of all remember the precept that was drilled into you in your student days: "Never neglect to put your finger in the rectum." And yet how many of us do it without special indications? And how many life assurance proposal forms require it? I personally have not seen one that does.

Are there any symptoms that should make one suspect carcinoma as opposed to benign hypertrophy? Among the 200 odd case histories perused at the Royal Adelaide Hospital the first symptoms, when recorded, were: frequency and difficulty of micturition 56%, symptoms due to metastases 25%, acute retention of urine 8%, hæmaturia 5%, pain on micturition 4%, toxæmia 2%.

The commonest first symptom is obviously not more significant of carcinoma than of adenoma; the next one does not help us, although the most indicative; the third, acute retention of urine, that is, sudden blockage with little or no evidence of previous difficulty, is said to be significant, but unfortunately the condition is usually in an advanced stage when it arrives at this—it is not a common first symptom; pain on micturition is said to be significant also, but it occupies a low position as a first symptom, and although it has often made me think of carcinoma, more often the cause of the pain has turned out to be prostatitis, with or without hypertrophy, calculus with hypertrophy, or bladder carcinomata. Hæmaturia appears to be less significant than in benign hypertrophy.

No, there is little to guide one symptomatically; it is only the careful investigation of men over forty years who complain of the slightest bladder neck irritability or difficulty that will find them. Rectal examination must be done; it may give one cause for suspicion, though not invariably, since in 5% of cases the condition does not commence in the accessible posterior lobe; examination of the wet film may immediately point away from malignancy to infection and inflammation and a normal film will be still more valuable; examination of a stained smear, fixed and stained by the Papanicolaou method,[11][14] may even show an experienced cytologist the typical carcinoma cells, but it is the biopsy of the gland that is most informative. The material for biopsy should be removed from the meatal aspect of the gland by means of a punch or resectoscope, and from the perineal aspect by puncture and aspiration.

At this early stage serum phosphatase estimation does not help in dividing the sheep from the goats, that is, it will not pick out the sheep, but it may help to distinguish some of the goats—the inoperable ones; then, of course, one need not worry about the other criteria. The work of Woodard and Dean[2][10] appears to promise the possibility of distinguishing the prostate moiety of the serum acid phosphatase which should not be above one Bodansky unit; I don't think it is generally accepted yet, but if it is, such a test may prove very useful in early cases.

My criteria for the radical operation are as follows: (i) Symptoms of bladder neck irritability or obstruction should be present. (ii) Rectal examination should demonstrate no extension beyond the gland. (iii) Biopsy should prove malignancy. (iv) Radiography should fail to show any metastases in bone. (v) The serum acid phosphatase content should be below four King-Armstrong units. (vi) The patient's expectation of life should be about ten years. That means that a man of seventy years should be hale enough to withstand both the operation and the other hazards of wear and tear not connected with the operation or the carcinoma. (vii) One might add estimation of the sedimentation rate, though in the present state of our knowledge I should not let a high result deter me when other criteria are favourable. A normal range would certainly encourage me. Thirty millimetres per hour (Westergreen) being taken as the normal level, to rule out all borderline cases, in 100 cases of carcinoma[9][15] with metastases an average rate was found of 61·5, but 23% of the results were within normal range. A high reading is therefore suggestive of carcinoma with metastases, but a low one is inconclusive.

The radical operation is a major one requiring an experienced urological surgeon. So I shall not worry you with technical details, except to explain that the block dissection includes the prostate, seminal vesicles, ampullæ and proximal portions of the vasa, posteriorly the fascia of Denonvillier, and anteriorly that portion of the urinary tract which includes the bladder neck, the trigone covering the gland, and the posterior part of the urethra. The perineal route is employed by the American pioneers, a suprapubic approach is used by Morson, of London, and recently Millen has recommended the retropubic approach. The latter is really suprapubic, since the bladder must be opened, but differs from the Morson technique in commencing the removal from the distal end of the prostate.

I have performed the perineal operation six times, but would like to try the retropubic approach in my next case—if I find one.[1]

My results can be best gauged from Table II. Cases I and II were bad selections, but at that time we had no biochemical criteria. Case III, not being one of primary prostatic carcinoma, required the same technique, and at least shows a good functional result. I am optimistic about Cases IV and VI, since these were cases of conditions that usually metastasize early, and there have been no developments to date. In Case IV the patient underwent orchidectomy, but received no œstrogen, whilst in Case VI neither was used; on the whole I believe in keeping this method of attack in reserve till required. In Case V the result might be termed a partial success, if one assumes that by removing the primary neoplasm and preventing further permeation therefrom, one has rendered the deposits already laid down more amenable to hormone therapy. Because of this possibility I consider the surgeon should not be unduly disappointed by failure to obtain a five-year cure.

Colston[6] states that if one is keen he should be able to find 20% of cases suitable for radical operation among patients in hospital, but Lowsley[13] states that in less than 5% are the patients actually seen in hospital in time. I

[1] Since this was written the next case has been found.

TABLE II.
Notes on Six Patients Submitted to Radical Prostatectomy.

Serial Number.	Preoperative Clinical Findings.	Radiographic Evidence.	Serum Phosphatase Content.	Result.
1	Age fifty-eight years. Acute retention. Transurethral resection. Laboratory diagnosis.	?Pelvic metastases.	Not determined.	Urine function normal. Death in two years with multiple osteolytic metastases, staghorn calculi both kidneys, uræmia.
2	Age seventy-five years. Acute retention. *Per rectum*, prostate hard and nodular.	No record.	Not determined.	Urine function regained. Death in hospital from cardiac failure.
3	Age fifty-one years. Secondary prostatic carcinoma from trigone and posterior urethra.	No metastases.	Not determined.	Urinary function normal. Well after six years.
4	Age fifty-five years. Frequency. Residual urine two to three ounces. *Per rectum*, prostate hard and irregular. Biopsy confirmation.	No metastases.	Normal.	Some diurnal incontinence, controlled by clip; patient satisfied. Well after three years without radiological or biochemical evidence.
5	Age sixty-eight years. Acute retention. *Per rectum*, prostate hard. Suprapubic prostatectomy difficult, suspicious. Laboratory confirmation.	Sacrum suspicious.	Both acid and alkaline phosphatase raised.	Incontinent; wound broke down owing to onset of diarrhœa and melena caused by occult gastric ulcer. After three years radiologically sacrum unchanged; no other bone involved. Serum acid and alkaline phosphatase raised slightly. Sacral pain.
6	Age fifty-three years. Clinically benign. Prostatectomy difficult. Laboratory confirmation.	No metastases.	Normal.	Urinary function normal. After two years well except for tenderness of perineal scar. No radiological or biochemical evidence of metastases.

feel sure that we here do not see anything like that proportion, but I believe we might do so if we adopted a more optimistic vigilance.

Benign Prostatic Hypertrophy.

Examination of the wet film has its value for the consulting room type of patient who has bladder neck irritation and/or more or less difficulty, with residual urine of not more than a few ounces. As was mentioned earlier in this paper, many of these men have recurrent attacks of prostatitis, the clearing up of which relieves them of their symptoms to a great extent, and it is always a good Listerian principle to get rid of as much infection preoperatively as possible; a prostate that harbours infection is not one to be unhesitatingly opened up to the large venous sinuses or the general urinary tract. Again I have occasionally seen a small middle-lobe projection per cystoscope which has been thought to be an early hypertrophy, but which disappears after non-surgical treatment to the gland. The case quoted under "prostatitis" is illustrative. If one were to resect such a projection transurethrally one would be faced with a sloughy prostatic wound that would only add to one's difficulties by increasing the infection.

The treatment of benign hypertrophy does not particularly interest the general practitioner who passes on his major surgery to the surgeon, but nowadays the general practitioner is so well equipped in most branches of medical practice that he feels confident to do much of his own surgery, and on the whole does a good job. It is mainly to those of you so minded that I wish to speak.

My first precept is: "No case of prostatic obstruction can be diagnosed properly without a cystoscopy or cystourethroscopy." The finger in the rectum, though necessary, is likely to produce fallacious conclusions here; only an examination of the interior of the bladder will, firstly, clinch the diagnosis of obstruction, secondly, guide one to the most suitable operative procedure, and, thirdly, disclose the presence of concomitant conditions which are not so easily found when the bladder is laid open. Of course, there are contraindications to cystoscopy, such as impermeability, gross infection *et cetera*, when a preliminary cystotomy is called for; but failing this cystoscopy should be considered the *sine qua non* to any cystotomy.

My next injunction is: "Employ the simplest treatment commensurate with the maximum safety to your patient." There is no "best" operation for all cases. There are a number of good ones that take precedence according to (i) the local condition, (ii) the general condition, and (iii) the skill and experience of the surgeon. One reads of the excellent results obtained by, say, the Harris, Millen, or Hey technique, and again by transurethral diathermic resection, and often one hears one of these extolled as the best procedure for the majority of cases. That may be so in the hands of the experienced writer of such eulogies, but one does not hear so often of the morbidity or mortality that occurs in the first cases of the less adept who attempt these procedures. Some conditions therefore may be best treated by a suprapubic or a retropubic or even a perineal operation, whilst others may be better resected. Even in the latter procedure there are different principles involved according to the apparatus employed. I have here three resectoscopes that perform their duties in very different ways; all are useful for certain types; one has been in use for several years before the first loop resectoscope came to Adelaide, and is still a good standby. These instruments can be seen by anyone interested.

Surgery in all its branches tends to become progressively more specialized and more complicated for the general surgeon, and the apparatus more costly, one instrument being rapidly superseded by a better and more expensive, so that in the case of the prostate, only the surgeon who performs an unusually large number of operations can be sufficiently experienced and mechanically equipped to choose the most suitable method of treatment.

As Mr. I. B. Jose said a few months ago, it is advisable for the man whose opportunities for performing prostatectomy are limited, to concentrate on one technique and become proficient at that before attempting to master them all, and one should be familiar with the suprapubic technique before trying to learn the retropubic. One might add that any surgeon commencing to learn the technique of transurethral resection should first be familiar with endoscopic examinations and manipulations in the posterior part of the male urethra.

If, after what I have said, you feel yourself competent to treat surgically your own prostatic hypertrophy patients, bearing in mind the precept "simplicity commensurate with safety", I offer you no apology in placing before you a technique that I believe fits the bill. Mind you, I am not trying to sell you another "best" method, though I admit that I am exploiting the occasion to justify an operation which I described seventeen years ago,[6] in paying tribute to the late Harry Harris, and which has not fulfilled any of the dire prophesies of its critics.

As regards "simplicity" the armamentarium required is very inexpensive, and if the technique cannot be performed by the would-be surgeon it cannot be safe for him to do bladder surgery at all. Regarding "safety", as judged by minimal blood loss during and after operation, absence of extravasation into the tissues, and activity of the patient during his brief post-operative catheter life, it compares favourably with any other technique. I am also satisfied that my patients usually experience return of good bladder function as quickly as is claimed for any

other method, and that none of the prophesied late effects, such as sloughing of the bladder neck, secondary hæmorrhage and median-bar formation, have occurred.

Much of the technique has been borrowed from Harris, who, however, would not admit it as a modification of his own, and one important hint from Morson, but there are essential differences, such as:

1. The ignoring of bleeding points till completion of the technique. If "spurters" are seen they should be clipped and included in one's later suture, much as one does in gastric surgery. There is nothing to be gained and much to be lost by the spending of much time trying to control individual bleeding points by separate suture; you will eventually get your hæmostasis by doing this, but more by virtue of a fall in blood pressure than anything else. Traction on the postero-lateral edges of the prostatic

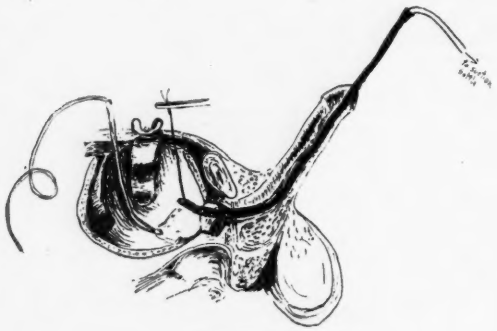

FIGURE II.

Prostatic cavity ready for suture.

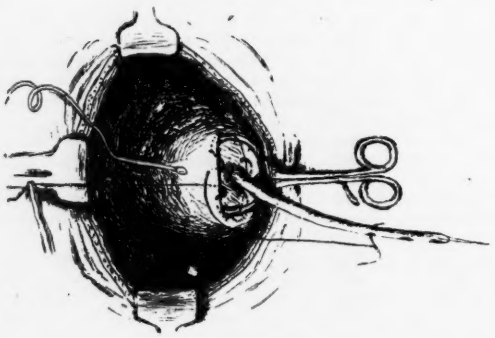

FIGURE III.

Morson's spreader stretching and lifting cavity margins: purse-string inserted and catheter transfixed.

cavity by two broad-toothed tenacula, or better still by the Morson spreader which I have lately adopted, tends to prevent spurting of vessels. With such traction, combined with suction on the distal end of a many-eyed catheter as shown in the diagram, the field is kept fairly clear of blood, and the depths of the cavity can be often clearly inspected.

2. The use of a purse-string suture to obtain hæmostasis at the edge of the cavity.

3. Traction of a cone of musculo-mucosa of the trigone and bladder neck into the cavity, in order to cover the cavity margins—not as a plastic reconstruction of the posterior part of the urethra—to maintain hæmostasis in the manner of a Foley catheter, and to allow of further control should reactionary hæmorrhage occur.

4. The employment of a safety valve suprapubic drain, its independent exit so placed that sealing of the opening occurs immediately after removal of the tube in thirty-six hours.

Since this paper is not essentially surgical, I shall spare you many details, but would be glad to embellish it should anyone be specially interested. The diagrams (Figures II, III and IV) may give a general idea; it will be seen that the armamentarium is not very elaborate or expensive, and that there has been some evolution in the technique since 1932.

Summary.

To recapitulate the precepts and principles that I have felt necessary to bring to your notice:

1. The "wet film" examination of the prostato-vesicular secretion is a consulting room procedure, and should be used whenever possible.
2. Recognition of a prostatic carcinoma in its early stage may lead to a radical cure.
3. Every opportunity should be taken to make a digital examination of the adult male rectum.
4. Cystoscopy is the *sine qua non*, with few exceptions, to prostatectomy.
5. "Simplicity, commensurate with maximum safety", should be the guiding principle in the treatment of prostatic hypertrophy.

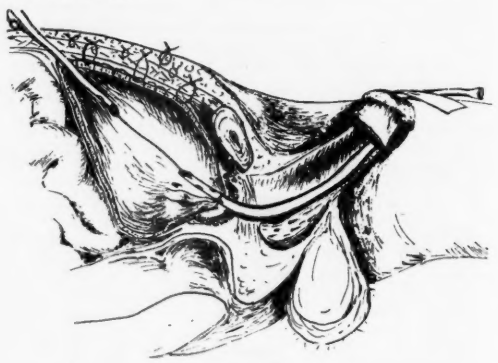

FIGURE IV.

Operation completed: cone drawn into cavity by catheter traction, which is maintained by strapping to left thigh. Anchoring of catheter to abdominal wall optional and usually unnecessary. Bladder apex partly Witzelized round the abdominal catheter, but not shown.

References.

(1) Arnheim, F. K. (1948), "Carcinoma of the Prostate: A Study of the Postmortem Findings in 176 Cases", *Journal of Urology*, Volume LX, page 599.

(2) Beatty, R. P. (1948), "Life Expectancy in Carcinoma of the Prostate: A Five Year Survey of Eighty-eight Cases", *Journal of Urology*, Volume LX, page 614.

(3) Birdsall, J. C. (1948), "Carcinoma of the Prostate Gland", *Journal of Urology*, Volume LIX, page 220.

(4) Boylan, R. N., and Tillisch, J. H. (1948), "The Value of the Combined Phosphatase and Sedimentation Rate Determinations in Diagnosis of Metastases in Prostatic Carcinoma", *Journal of Urology*, Volume LIX, page 931.

(5) Cleland, J. B. (1945), "The Pathological Lesions in 5,000 Australian Autopsies", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 625.

(6) Close, W. J. (1932), "Prostatectomy with Closure of the Bladder, with Reference to a Modification of the Harris Operation", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, page 47.

(7) Close, W. J. (1944), "Seminal Vesiculitis", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 170.

(8) Colston, J. A. C. (1945), "Surgical Removal of Cancer of the Prostate Gland: The Radical Operation", *The Journal of the American Medical Association*, Volume CXXVII, page 69.

(9) Edwards, C. (1945), "Hormonal Treatment of Carcinoma of the Prostate Gland", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 165.

(10) Ham, H. J. (1945), "Carcinoma of the Prostate", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 168.

(11) Herbut, P. A., and Lubin, E. N. (1947), "Cancer Cells in Prostatic Secretion", *Journal of Urology*, Volume LVII, page 542.

(12) Huggins, C. (1941), "Effects of Castration on Prostatic Carcinoma", *Annals of Surgery*, Volume XLIII, page 209.

(13) Lowsley, O. S. (1942), quoted in *The Journal of the American Medical Association*, Volume CXIX, page 950.

(14) Papanicolaou, G. N. (1946), "Diagnostic Value of Carcinoma Cells", *The Journal of the American Medical Association*, Volume CXXXI, page 372.

(15) Tillisch, J. N., and Babein, H. C. (1943), "The Sedimentation Rate in Cases of Benign Hypertrophy and Carcinoma of the Prostate Gland, and Carcinoma of the Prostate Gland with Metastases", *Journal of Urology*, Volume XLIX, page 857.

[16] Woodard, H. Q., and Dean, A. L. (1947), "The Significance of the Phosphatase Findings in Carcinoma of the Prostate", *Journal of Urology*, Volume LVII, page 159.
[17] Young, H. H. (1937), "Radical Cure of Carcinoma of the Prostate", *Surgery, Gynecology and Obstetrics*, Volume LXIV, 1937, page 472.

NITROGEN MUSTARD: THE USE IN SOUTH AUSTRALIA OF METHYL BIS(β CHLOROETHYL) AMINE.

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OWING to the kindness of the American Cancer Society, which has made two gifts of nitrogen mustard to the Anti-Cancer Committee of the University of Adelaide, the Radiotherapy Clinic of the Royal Adelaide Hospital was in 1948 able to treat a number of patients with this compound. Our thanks are due to the Society for this act of grace, and in particular to Dr. D. A. Karnofsky who was largely instrumental in arranging these gifts.

The field for which these drugs can be used is not a wide one, being limited chiefly to the lymphomata and certain blood diseases, but within this orbit they are capable at times of producing real benefit.

I am indebted to various American, English and other writers for much of the material that appears in this paper. Our findings confirm what has already been written and break no new ground. As, however, the use of this group of drugs is relatively new to Australia, it was thought worth while to give some account of their action and to put on record the results in the cases in which we have so far used them.

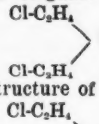
During and after World War I considerable study was made of the changes induced in the body by the action of mustard poison gas, and numerous papers, clinical and pathological, were written on the subject.

Little clinical use appears to have been made during the next two decades of the facts that emerged from this study. In the years following 1930 some attempts were made to use this substance to treat neoplastic disease, but it was not till ten years later that the closely related nitrogen mustards began to be utilized. Since then this group of drugs has come into prominence, and has been employed both experimentally in the laboratory and clinically for the treatment of disease on a considerable scale. This clinical use is still experimental, and the supply in America has been under the control of the Committee on Growth of the National Research Council (of which committee Dr. C. P. Rhoads is chairman) in cooperation with the Chemical Warfare Service of the United States Army. Nitrogen mustard is now for the first time on sale in Australia; but approval for its use in any case must first be obtained from the Therapeutic Trials Committee for Radioactive Isotopes of the State in which the patient is to be treated, before any can be purchased.

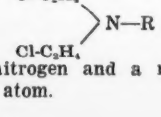
The group of drugs comprises the following:

		Code.
bis(β chloroethyl) sulphide	mustard gas	H
ethyl bis(β chloroethyl) amine	nitrogen mustards	HN_1
methyl bis(β chloroethyl) amine		HN_2
tris(β chloroethyl) amine		HN_3
isopropyl bis(β chloroethyl) amine		TL 301

The formula of the original mustard poison gas is

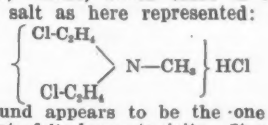


and the fundamental structure of the nitrogen mustards is



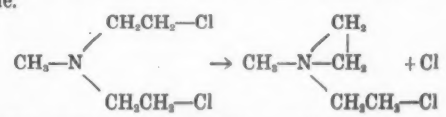
where an atom of nitrogen and a radical group have replaced the sulphur atom.

The compound made available to us was methyl bis (β chloroethyl) amine, which came in the form of the hydrochloride salt as here represented:



This compound appears to be the one most generally used on account of its lower toxicity. It comes in 10 cubic centimetre capped flasks containing 10 milligrammes, which quantity is almost too small to be visible. When it is to be used 10 cubic centimetres of saline are introduced into the flask by means of a serum syringe. The salt quickly dissolves and the appropriate amount is drawn into the syringe and the rest discarded. Care must be taken, because it is a highly vesicant and irritating solution. More will be said later about the mode of administration. It is necessary that the solution should be used at once as the half-life of HN_2 in solution at pH 7·4 and 30° C. is 90 seconds.

It becomes converted by intramolecular change into methyl β chloroethyl ethylenimonium with evolution of chlorine.



Different writers give slightly varying structural formulæ for this latter compound, but in any case an imine ring is formed which appears to be responsible for some of the effects produced by this group of drugs. The parent compounds are tertiary amines, but with the altered valence of the nitrogen quaternary cations of high solubility are formed with properties differing widely from the compound of origin.

One of the derivatives, methyl β hydroxyethyl ethylenimonium, has a strong paralytic action. It is of interest to note in passing that curare also is a quaternary compound.

Table I[a] gives a comparison of the pharmacological actions of methyl bis(β chloroethyl) amine and its products of transformation in aqueous solution.

So it is seen that slight alterations produce widely varying pharmacological effects. This is a hopeful factor, as an almost infinite number of β halogenated amines can be prepared. With a high degree of specificity for the varying compounds, is it too much to imagine that chemotherapeutic agents may be produced which will have a profound effect on neoplastic cells while being relatively harmless to the normal cell? Work in this direction is in America proceeding apace, but as Woglom[a] has pointed out, the task is very difficult, so small is the difference between the cancer cell and its normal ancestor.

Experiments have shown that nitrogen mustard has a considerable effect on mouse sarcoma, and that in mouse leuchæmia the survival time is increased by 50%.

Principal Effects.

I shall not further refer to the more esoteric actions of these drugs, but will pass on to the effects that more closely concern us with the diseases treated. Nor shall I refer to effects produced save by intravenous injection, which is the only mode clinically used.

Of these effects the most striking are leucopenia, regression of lymphoid tissue, bone marrow aplasia and damage to the intestinal tract.

Leucopenia.

The most outstanding feature of intoxication with HN_2 is the leucopenia produced. This has been found to occur in all animals studied. Lymphocytes are the first cells affected, after which the granulocytes also show changes. This is first seen as a "shift to the right" through the failure of young granulocytes to appear in the circulating blood. Then the polymorphonuclear leucocytes are reduced in number as a natural consequence, and other blood elements are affected also. Thus the usual picture is an

TABLE I.[3]

Compound.	Approximate Relative Toxicity.	Convulsant Action.	Parasympathomimetic Action.	General Cytotoxic Action. Delayed Death.	Hæmopoietic Tissue Damage.	Paralytic Action.
Methyl bis (β chloroethyl) amine	1	+	+	+	+	+
Methyl β chloroethyl ethylenimonium	$\leqslant 1$	−	++	+	+	+
Methyl β hydroxyethyl β chloroethylamine	About $\frac{1}{10}$	−	−	−	−	+
Methyl β hydroxyethyl ethylenimonium	$\frac{1}{3}$ to $\frac{1}{2}$	−	−	−	−	++
Methyl diethanol amine ..	$<\frac{1}{100}$	−	−	−	−	−

early fall in lymphocytes, then a fall in granulocytes and reticulocytes with a slight decrease in red cells and hæmoglobin value. According to Jacobson,[3] thrombocytopenia develops.

Thus it appears that the adult cells in the blood, except perhaps lymphocytes, are unaffected, the essential effect being a failure of cellular replacement by the blood-forming organs. Examination of the bone marrow shows swelling and dissolution of the hæmatopoietic cells, passing on to a condition of aplasia, the degree of which corresponds to the dosage. These changes do not appear for about forty-eight hours, although the damage apparently occurs almost at once. If the blood supply to an organ is temporarily stopped at the time of administration of the drug and then restored a few minutes later, no changes appear in the part so conserved.

Lymphoid Tissue.

The response of lymphoid tissue is also striking. There is early involution with pronounced regression in the size of thymus, lymph nodes and spleen.

Intestine.

Large doses produce gross damage to the intestinal tract, involving the whole of the small intestine, giving rise to bloody diarrhœa and going on to necrosis.

Testes.

In experimental animals necrosis of the spermatids is said to occur with temporary sterility. In animals that survived, the testes returned to normal some time after the bone marrow had recovered.

Comment.

With therapeutic doses there is a gradual return to normal of the blood-forming tissues and the circulating blood. A "shift to the left" in the white cell count is one of the signs that recovery is taking place. Bone marrow appears to recover completely from such dosage, but so also, unfortunately, do the tissues participating in the neoplasia or other abnormal process. However, in certain diseases worthwhile remissions are obtained.

Irradiation and Nitrogen Mustard.

It will thus be seen that the effects produced are very similar to those caused by irradiation with X or γ rays, so much so that these drugs have been described as radiomimetic. The effects resemble to a less degree those produced by benzol or arsenic.

For the purpose of comparison a brief summary of the changes produced by whole body irradiation is given[4] as follows: (i) brief latent period; (ii) anorexia and weight loss; (iii) diarrhœa; (iv) extreme prostration; (v) death; and at autopsy it is found that the lymphatic organs are atrophic, the intestines ulcerated and the bone marrow aplastic. Lymphatic tissue again appears to be the most sensitive, with early fragmentation of lymphocytes, marked involution and necrosis of the spleen, thymus and other lymphoid tissues.

The cytotoxic effects of nitrogen mustard are largely nuclear in their impact, and it is of interest to note that both this agent and irradiation are capable of producing mutations.

Karnofsky[5] states that both agents achieve their effect on the cancer cell chiefly by acting on the remaining normal portion of the cell—that is, the portion of the cancer cell retaining the functional and chemical characteristics of the tissue of origin.

A big difference between irradiation and nitrogen mustard is that the latter always produces a general effect. Irradiation, on the other hand, is almost always intentionally localized in its use, being directed to some particular region. I shall return to this point later.

Clinical Applications.

On passing to the clinical side, it may be stated at once that the chloroethylamines have been tried in the treatment of many neoplastic diseases. They appear to be of some temporary benefit in the more anaplastic lung carcinomata, and in a number of *The British Journal of Cancer* recently received there is an article by Boyland and others[6] on their use in a series of cases of bronchogenic carcinoma. The patients treated were drawn from the Royal Cancer Hospital and from the Neoplastic Clinic of the Brompton Hospital.

The writers report that of 41 patients so treated none showed adverse effects, and benefit was obtained by approximately half the patients. Remissions lasted from two to twelve weeks and included the easing of pain, cough, malaise and anorexia. A number of patients also showed objective improvement, such as decrease in sputum, decrease in size of metastatic tumour and increase of weight. The authors comment on the apparent specificity of the chloroethylamines for this type of cancer, and express the hope that with alteration of the molecule, improvements in dosing and additional treatment with other substances, effects of greater value may be obtained.

No beneficial effect has been found in cancer of the breast, prostate, tongue, uterus, ovary or gastro-intestinal and urinary tracts (except in a few cases in childhood), nor, as a rule, in multiple myeloma. However, some writers give a different opinion about this last. Malignant melanoma was thought by some to show a degree of response in certain cases.

The group of diseases in which as a rule worthwhile improvement was achieved included lymphogranuloma (Hodgkin's disease), chronic lymphatic leuchæmia, lymphosarcoma, giant follicular lymphadenopathy (Brill-Symmer's disease) and *polycythæmia rubra vera*. In chronic myeloid leuchæmia a variable response was obtained and in the acute leuchæmias no benefit at all was recorded.

Even with this suitable group of diseases the results were not always uniform, and some patients showed no benefit whatever. Nevertheless, as a general rule, such patients did benefit and showed remissions of several months.

Thus in a group of cases reported by Jacobson and others[6] in *The Medical Clinics of North America*, all patients with polycythæmia were still in remission four to seventeen months after treatment, while those with chronic lymphatic leuchæmia showed remissions of two to twenty-four months, chronic myeloid leuchæmia up to three months, lymphosarcoma one to ten months and lymphogranuloma one to ten months.

There is another important point. When certain patients have ceased to respond to X rays, not only are they often relieved by a course of HN_2 but the capacity to respond to further irradiation may be restored. At least one and perhaps two of our patients appear to have shown this effect, but it must be remembered that by no means all have received subsequent X-ray therapy. Nor is this all. Both HN_2 and X rays can be administered at the same time; this is unlike the use of urethane, during which it is obligatory to discontinue irradiation.

The mode of administration has been to give an intravenous injection of 0·1 milligramme per kilogram of the patient's body weight each day for four days. At first this solution was injected directly into an arm vein by means of a 10 cubic centimetre syringe, but latterly we have adopted the method advised by the Americans of injecting the solution into a rubber tube through which saline is already flowing into a vein. They suggest that this is likely to avoid such unpleasant side-effects as thrombosis and thrombophlebitis. Fortunately even with the earlier method we have escaped these troubles.

In England Boyland has been giving 0·2 milligramme per kilogram for two days, and we have adopted this division of dosage in a number of recent cases. The total dose for a course for an average sized individual approximates to 25 milligrammes.

Some of the earlier subjects in America were given larger doses, even up to eight or ten injections of 0·1 milligramme per kilogram in a single course of treatment.[7] Although some patients showed a dramatic effect on the disease, the damage to the bone marrow was permanent and disastrous.

If the dosage is kept within normal limits it can be repeated in two or three weeks' time. Some patients are reported as having had well over 100 milligrammes in divided courses without ill effect. Several of our own patients have had two courses, and one who died shortly afterwards underwent a post-mortem examination, in which special attention was paid to bone marrow and other structures. No evidence of damage from the drug was apparent.

Two or three hours after the initial injection the patient usually suffers from nausea and vomiting, but these are transient and neither serious nor distressing. One of our patients did complain of nausea for a week or two, but this was exceptional. She has subsequently had a partial gastrectomy for carcinoma of the stomach. From our series of cases nausea appears to be less likely if the mustard is administered in an already flowing stream of saline as has been described. Most were given pyridoxine in modest dosage in an attempt to prevent this symptom.

A course of treatment is followed by lymphopenia, neutropenia and thrombocytopenia. This condition reaches its maximum in three weeks, and a white cell count of 2000 or less per cubic millimetre is common. In America a count as low as 300 per cubic millimetre has been recorded. Any anæmia is usually mild.

The bone marrow recovers after a varying interval, and this is shown by the return of the circulating blood to normal.

Glandular masses in appropriate cases either disappear or are much reduced in size. The spleen if enlarged regresses considerably, but may remain palpable.

Reports of Cases.

The patients treated at the Radiotherapy Clinic of the Royal Adelaide Hospital at the date when this paper was compiled in December, 1948, numbered 17, and their disorders were made up as follows: lymphogranuloma seven cases, lymphosarcoma three cases, chronic lymphatic leuchæmia two cases, carcinoma of the lung two cases, reticulosarcomatosis one case, acute myeloid leuchæmia one case, acute lymphatic leuchæmia one case.

A brief account of each case is herewith appended.

CASE I.—B.McA., aged nineteen years, a female patient, suffering from lymphogranuloma, was first examined in December, 1945. She was treated with deep X-ray therapy until January, 1948, when she had her first course of HN_2, receiving 20·4 milligrammes in four days. She has since had further deep X-ray therapy and a second course of 20·0 milligrammes of HN_2 in two days in August, 1948. She has improved considerably. Her condition was of severe degree, with glandular and other masses, bony involvement of the spine, and Hodgkin's ulceration of the breast. Examination of a lymphatic gland and of the breast ulcer showed lymphogranuloma in both. The offensive smell so often noted with these patients was pronounced in her case. This diminished greatly after the administration of chloroethylamine. She remains somewhat better than she was in January. She is one of the patients who appear to have responded better to irradiation since the administration of nitrogen mustard.

CASE II.—M.H., a female patient, aged twenty-eight years, suffering from lymphogranuloma, had become ill in February, 1945, with pleurisy and glandular masses in the neck and mediastinum. She lost weight and later developed a mass in the right breast.

She received deep X-ray therapy from March, 1945, to June, 1948. In January, 1948, she was given 18.8 milligrammes of HN_2 and had a further course of 20 milligrammes in May. She showed temporary benefit, but developed neurological symptoms probably from spinal cord involvement and died in June.

CASE III.—K.A., a male patient, aged thirty-six years, was suffering from lymphoblastic lymphosarcoma. His illness began in July, 1946, with abdominal masses, enlarged glands in the groins, anæmia and leucopenia. He received deep X-ray therapy intermittently between July, 1946, and April, 1948, and was given two courses of HN_2, 26·8 milligrammes in February, 1948, and 25·2 in May. He showed temporary improvement, but died in the latter month. His disease was aggressive throughout, and he was in the terminal stages when he was given chemotherapy. However, I do not think he would have benefited greatly had such treatment been available earlier. At autopsy, shortly after the second course of HN_2, in spite of careful search, no evidence of damage due to the drug was found.

CASE IV.—V.M., a female patient, aged sixty-five years, was suffering from lymphogranuloma. The onset of her illness was in February, 1948, with enlarged glands and spleen. She was treated first with HN_2, of which she received 24 milligrammes in that month. She improved greatly and remained apparently well for seven months. In October there occurred a rapid enlargement of glands with œdema of the thigh, leg and arm. With deep X-ray therapy she has again improved greatly and has lost the œdema.

CASE V.—A.T., aged forty years, a female patient, was suffering from lymphogranuloma. Her history goes back to 1943. She then showed signs of a mediastinal tumour and had congested veins of the neck and thorax. Later pulmonary opacities and abdominal masses developed. She was under deep X-ray treatment for five years and her condition improved greatly, the opacities in the lungs disappearing and the glands and masses regressing. In March, 1948, she was given 24 milligrammes of HN_2 and showed considerable improvement. She complained of nausea for a week or two after the mustard, but later picked up and stated that she was hungry.

Later the patient showed signs of gastric obstruction, and in June underwent a partial gastrectomy. The pathologist stated that examination of the section showed carcinoma of the stomach. This is surprising, as one would have expected this process to be lymphogranuloma also.

This patient is one of the few whose diagnosis has not been proved histologically; but the response to irradiation and the clinical history are strongly in favour of Hodgkin's disease. She is now surprisingly well.

CASE VI.—C.H., aged sixty-three years, a male patient, was suffering from chronic lymphatic leuchæmia. The illness began in September, 1947, and the patient was treated elsewhere with deep X rays. His condition improved until April, 1948, when he had a number of hæmorrhages, numerous enlarged glands and a greatly enlarged liver and spleen. In May he was given 30 milligrammes of HN_2, and dramatic improvement in his general condition and in his blood picture followed, with decrease in the size of his liver, spleen and glands.

However, three months later his symptoms returned, his condition deteriorated, and he died of terminal pneumonia in another hospital.

CASE VII.—M.H., aged twelve and a half years, a male patient, was suffering from acute myeloid leuchæmia, which developed in May, 1948. In June he received 10·5 milligrammes of HN_2, but showed no improvement whatever. He died a few days later.

CASE VIII.—J.MacD., aged forty-six years, a male patient, suffering from chronic lymphatic leuchæmia, was first examined by us in June, 1948, but he gave a history of four years' duration. His condition was apparently diagnosed at that date, but no record is available as to his treatment. He was given 25·2 milligrammes of HN_2 at the Royal Adelaide Hospital and improved greatly. He has not been seen since a few weeks after treatment.

CASE IX.—V.S., aged forty-two years, a male patient, suffering from reticulosarcomatosis, had become ill in January, 1948, and was referred to the clinic in June. Slight enlargement of numerous lymphatic glands was present, and skiagrams revealed destructive changes in many bones. He complained of bone pains. Examination of an excised gland showed the normal architecture to have been destroyed and replaced by reticulo-endothelial cells. He was given 24 milligrammes of HN_2 in July and 25 milligrammes in September. In August his neck was treated with deep X rays. He developed severe anæmia, possibly from his bone condition, but otherwise showed appreciable improvement, including relief of pain. No obvious improvement of the bone structure was apparent in subsequent skiagrams.

CASE X.—C.K., a male patient, aged fifty-one years, was suffering from carcinoma of the lung. In this patient the upper lobe of the left lung appeared to be replaced by tumour. He was treated with deep X rays from July to September, 1948, and received 24·2 milligrammes of HN_2 in August. His condition appears to have improved.

CASE XI.—A.S., a male patient, aged eighteen years, suffering from acute lymphatic leuchæmia, had been ill for six weeks when he was seen at the radiotherapy clinic. He was given 12·6 milligrammes of HN_2 in August, 1948, but died within a few days without improvement.

CASE XII.—G.McI., aged fifty-four years, a male patient, suffering from carcinoma of the lung, was under deep X-ray treatment from December, 1947, to February, 1948. His condition improved somewhat, but later he began to lose weight and to complain of pain. In August he was given 20 milligrammes of HN_2. No improvement followed, but in December, 1948, he was still alive.

CASE XIII.—N.C., aged thirty-seven years, a female patient, was suffering from lymphoblastic lymphosarcoma. Her condition was very advanced when she was first examined in June, 1947. She had abdominal masses with ascites and œdema of the legs, and indeed her condition looked so desperate that her physician was doubtful if it was worth while attempting any treatment. Nevertheless, treatment was begun with deep X rays, although at first it was possible to treat only the anterior aspect of the abdomen. Later, as her condition improved, it became possible to use posterior fields as well.

With irradiation her condition improved greatly; she lost the ascites and œdema, but still retained some abdominal masses. In August she was given 20 milligrammes of HN_2 and further considerable improvement took place. The masses have not entirely disappeared, but when last examined she was gaining weight.

CASE XIV.—R.R., a male patient, aged fifty-four years, suffering from lymphosarcoma, had been under deep X-ray treatment at intervals from December, 1944, to July, 1948. His condition improved with this treatment. In September, 1948, he was given 20 milligrammes of HN_2, but showed no further improvement.

CASE XV.—W.H., aged fifty-eight years, a male patient, suffering from lymphogranuloma, had had no irradiation. He received 20 milligrammes of HN_2 in September, 1948, and his condition improved considerably.

CASE XVI.—E.M., aged forty years, a male patient, suffering from lymphogranuloma, received deep X-ray treatment at intervals from January, 1946, to May, 1948. His condition improved so much that he was able to continue with his work on a farm. Latterly he developed further enlarged glands and an enlarged liver and spleen. In September, 1948, he was given 25 milligrammes of HN_2 and considerable improvement followed, both in his general condition and in reduction of the local enlargements.

CASE XVII.—J.McL., aged twenty-one years, a male patient, suffering from lymphogranuloma, was first examined in October, 1948, when he looked very ill. He said that he had lost four stone in weight, and he had numerous enlarged glands. The offensive odour was pronounced. He received no X-ray therapy, but was given 25 milligrammes of HN_2. His condition improved greatly, he became bright and cheerful, and both the glandular masses and the odour disappeared.

The results of treatment in these cases may be set out as in Table II. Thus of the total of 17 patients, five are dead, two are not improved, and four showed modest improvement; six are left who show at the very least temporary great improvement. And of the dead, one improved dramatically, but later relapsed; he was not examined by us during his terminal illness.

Thus it appears that our best results were achieved with lymphogranuloma, next in order being chronic lymphatic leuchæmia. However, it is obvious that these figures are too small to have any statistical value. Nevertheless, they do correspond fairly closely with the results obtained elsewhere.

The patients suffering from acute leuchæmia were treated only because of their desperate straits, but no good was achieved. I do not think that life was prolonged even for a day.

A number of patients have had two courses of treatment, with a total dosage of about 50 milligrammes. Some of the later patients have been treated with two doses of approximately 0·2 milligramme per kilogram at twenty-four hours' interval. No patient has shown any ill effects from the use of the drug.

Discussion.

The close resemblance in the body of the results of irradiation and of chloroethylamine intoxication is of the greatest interest. The chief difference appears to be that of distribution. The administration of nitrogen mustard necessarily produces a general effect spread over the whole body. Irradiation on the other hand is almost always severely localized. As all radiotherapists know, a much larger radiation dose can be administered to a small field than to a large field. When radiation is

TABLE II.

Disease.	Number of Patients.	Much Improved.	Improved.	Not Improved.	Improved but Condition Deteriorating.	Deaths.	
						After Improvement.	No Improvement.
Lymphogranuloma	7	4	1		1	1	0
Lymphosarcoma	3	1		1		1	0
Acute leuchæmia	2						2
Carcinoma of lung	2		1	1			0
Chronic lymphatic leuchæmia	2	1				1	0
Reticulosarcomatosis	1		1				0
	17	6	3	2	1	3	2
						5	

administered to the whole body, only small doses can be given with safety. Nitrogen mustard chemotherapy appears to be in a position comparable to whole body irradiation.

No patient with carcinoma has been cured by the mustards, but many carcinomata have been resolved by irradiation. In certain sites, such as the skin, resolution after irradiation is expected almost as a matter of course.

Even in the cases in which the chloroethylamines are most suitable, no writer has ventured to suggest that they are superior to irradiation. On the contrary, the latter is still regarded as the better. One merit that these drugs do possess is that they may restore irradiation response to patients who have become resistant. They are, at present, no more than a useful adjunct to other methods of treatment of certain diseases. However, as I have previously stated, it is hoped that by varying the structure organic chemists may produce one or more agents of greater benefit for the treatment not only of the diseases we have discussed but for frank neoplasia as well.

Dr. Guy Lendon has pointed out that in this group of drugs we have an agent which can destroy red bone marrow with greater safety than any previous chemical. He urges that the following groups of diseases should be treated by this means: (i) generalized lymphogranuloma; (ii) lymphogranuloma and chronic lymphatic leuchæmia which have ceased to respond to X-ray therapy—it being remembered that such conditions after treatment with mustard may again become amenable to irradiation; (iii) leuchæmia which fails to respond to other treatment.

A final word about the remissions produced by these drugs may be of interest. We have found these on occasion to be very brief, even as short as two or three weeks. On the other hand some have lasted for more than six months. Although it is suggested that these remissions tend to be shorter than those produced by irradiation, we have so far no definite evidence that this is the case. Treatment is quick, the benefits on occasion are remarkable, and no patient has offered any objection to this form of therapy. Indeed, on the contrary, some have stated that they prefer it to X-ray therapy.

As a result of the year's work it is now the practice of the Radiotherapy Clinic to begin treatment of lymphogranuloma with a course of HN_2, reserving irradiation until a later date, and there is a strong tendency to treat chronic lymphatic leuchæmia in the same manner.

Now that the drug is more freely available in Australia, it is probable that at the clinic we shall make more frequent and more extensive use of it.

References.

(1) Philips, F. S., and Gilman, A. (1947), "The Relation between Chemical Constitution and Biological Action of the Nitrogen Mustards. Approaches to Tumour Chemotherapy", American Association for the Advancement of Science, Monograph, page 7.

(2) Woglom, W. H. (1947), "Approaches to Tumour Chemotherapy", page 1.

(3) Jacobson, L. O., Spurr, C. L., Smith, T. R., and Dick, G. F. (1947), "Radioactive Phosphorus and Alkylamines (Nitrogen Mustard) in the Treatment of Neoplastic and Allied Diseases of the Hæmopoietic System", *Medical Clinics of North America*, Volume XXXI, Part I, page 3.

(4) Graef, I., Karnofsky, D. A., Jager, V. B., Krichesky, B., and Smith, H. W. (1948), "The Clinical and Pathological Effects of the Nitrogen and Sulphur Mustards in Laboratory Animals", *The American Journal of Pathology*, Volume XXIV, page 1.

(5) Karnofsky, D. A. (1948), "The Bases for Cancer Chemotherapy", *Stanford Medical Bulletin*, Volume VI, page 261.

(6) Boyland, E., Clegg, J. W., Koller, P. C., Rhoden, E., and Warwick, O. H. (1948), "The Effects of Chloroethylamines on Tumours, with Special Reference to Bronchogenic Carcinoma", *The British Journal of Cancer*, Volume II, page 17.

(7) Goodman, L. S., Wintrobe, M. M., McLennan, M. T., Dameshek, W., Goodman, M. J., and Gilman, A. (1947), "Use of Methyl-bis (β Chloroethyl) Amine Hydrochloride and Tris (β Chloroethyl) Amine Hydrochloride ('Nitrogen Mustards') in the Therapy of Hodgkin's Disease, Lymphosarcoma, Leukæmia and Certain Allied and Miscellaneous Disorders", "Approaches to Tumour Chemotherapy", page 56.

"DEAD SPACE" IN CLOSED CIRCUIT ANÆSTHETIC APPARATUS: A CIRCUIT ABSORPTION UNIT OF MODIFIED DESIGN.

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IN the designing of apparatus for the administration of anæsthetic agents by the closed circuit method of carbon dioxide absorption, the elimination of dead space is a major objective.

The import of dead space depends on its relation to the respiratory tidal volume. The smaller the patient and the less the tidal volume, the more essential is it that the dead space be reduced to the minimum that may be obtained technically.

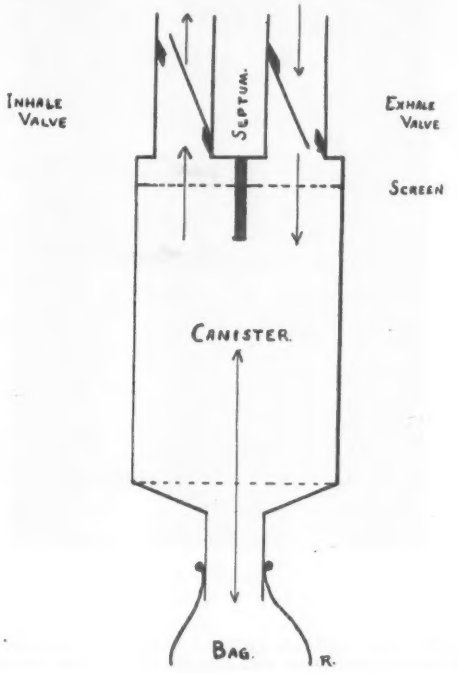

FIGURE I.
A modified absorption unit.

The two basic methods of removing carbon dioxide from anæsthetic mixtures are (i) the "to-and-fro" method of Waters and (ii) the "closed-circle" method of Sword. Each has advantages and disadvantages in convenience of handling, in possible efficiency of absorption and in the volume of dead space inherent in design.

It has been stated[1] that dead space is less in to-and-fro apparatus than in circle absorbers. The writer dissociates himself from this view.

Dead space is found in the mask hood, in the mask adapter and connexion and in the canister.

1. In the mask hood. Dead space here is common to both methods and is inevitable. Modern design aims at reducing its volume to a minimum.

2. In the mask adapter and connexion. In the to-and-fro method, the dead space is that between the mask and the canister. Owing to the wide bore necessary, an appreciable volume of dead space is unavoidable. It is further increased by the insertion of an ether drip feed between the mask and canister. In the circle method, the dead space is

that between the mask and the junction of the channels of the "T" or "Y" shaped hose adapter. In a well-designed adapter, the volume of dead space is less than that in a to-and-fro adapter. The insertion of an ether vaporizer adds no further dead space to the circuit. An additional small volume of dead space is created by the elastic rebound of the rubber hoses. Excessive rebound results from undue resistance somewhere in the circuit—that is, in the valve mechanism, in the channels of the apparatus or in the soda lime canister—and indicates faulty design.

3. In the canister. In the to-and-fro method there is some dead space at the proximal cone of the canister. By careful designing, this may be kept to a small volume, but it cannot be eliminated completely.

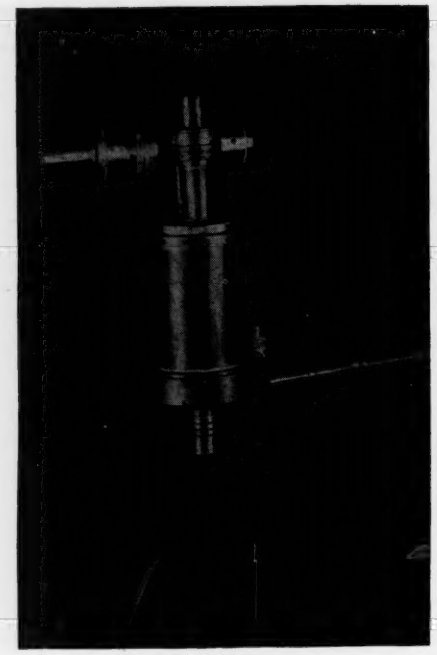

FIGURE II.
Simple form of absorption unit.

In the circle method, the flow of gas mixture, except for that through the mask and adapter to the point of junction of the "Y" piece, is unidirectional. There is no dead space in any unidirectional portion of the circuit. The total dead space in the circle absorber is that in the mask and adapter *plus* that due to rebound.

The following design, in which the better features of each method are combined and the disadvantages are eliminated, consists of the following: (i) a mask (which may be replaced by an endotracheal adapter); (ii) a "T" or "Y" shaped adapter of minimal volume compatible with an adequate area; (iii) inhalational and exhalational hoses valved for unidirectional flow; (iv) a modified soda lime canister; (v) a standard gas bag (Figure I).

The top of the canister is pierced by two orifices of adequate area and screened against entry of dust. Each leads to the housing of a unidirectional valve. A hose connects each valve to an arm of the adapter. Inside the canister, a diametric septum projects downwards sufficiently to dip below the level of the soda lime. The dip is great enough to render the septum effective even after the soda lime has packed itself down, as it does. This septum eliminates dead space and ensures that all the exhaled mixture comes into contact with soda lime before being inhaled again. The distal portion of the canister acts an an unmodified to-and-fro filter. The overall effect is that of a to-and-fro filter absolutely free from dead space.

Into the bottom of the canister is plugged a standard gas bag, with or without an interposed length of corrugated hose. The latter renders the bag more accessible for manipulation in assisted or controlled respiration.

In this simple form (Figure II) the apparatus has given very satisfactory absorption. A colleague reports more than favourably on the performance of a miniature model devised for infants.[2]

There is no provision for temporary short-circuiting of the gas mixture past the soda lime or for changing the soda lime should it become saturated. These features have been added to a later model by incorporating a suitable control tap (Figure III).

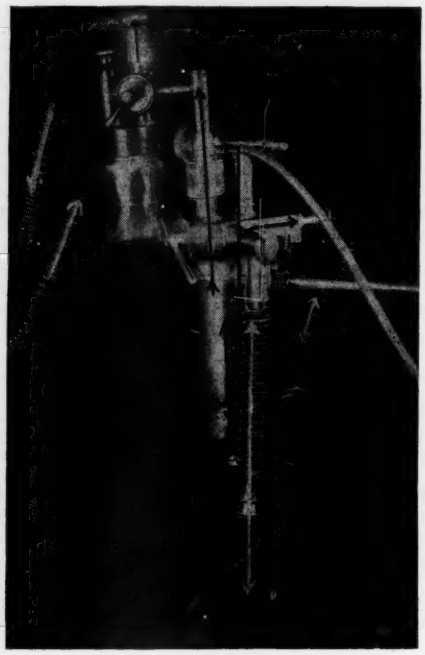

FIGURE III.
Absorption unit with by-pass and ether vaporizer. Arrows indicate movement of gas mixture during inhalation and exhalation.

References.

(1) G. Kaye, R. H. Orton and D. G. Renton: "Anæsthetic Methods", 1946, page 362.
(2) R. H. Orton: THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1948, page 376.

ROSEOLA INFANTUM (EXANTHEMA SUBITUM).

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ROSEOLA INFANTUM was first recognized as a distinct clinical entity by Zahorsky in 1910. In his most recent review of the condition he defines it as "an acute rubelliform exanthem occurring almost exclusively in infants, and characterized by a pre-eruptive critical fever".[1]

The disease seems to be well recognized by American writers, who describe it as a common disease, probably less common than measles, but certainly more frequent than rubella. However, one American writer has stated as recently as 1945 that "roseola infantum is one of the most forgotten, least appreciated, and most commonly

misdiagnosed of contagious diseases".[2] It seems to have attracted little attention from British writers, though in a recent text-book of infectious diseases it receives, under the alternative name of *exanthema subitum*, an accurate but brief description as one of the minor exanthemata.[3]

During the months of September, October and November, 1948, the writer encountered six cases of the disease in Brisbane, where it had not previously been recognized.

General Considerations.

Ætiology.

Nothing is known of the specific ætiology of the disease, and it is assumed to be due to a virus. The age incidence is important, 95% of all cases occurring among infants aged under two and a half years, and the majority of these between the ages of six and eighteen months. There is some uncertainty about the infectivity. The disease is probably infectious, and ward infection among young infants in the susceptible age group has been reported,[4] but as there is seldom more than one person in this age group in a family, the risk to other children is slight and strict isolation is unnecessary.

Spread is assumed to be by carriers and the incubation period to be eight to fourteen days.[1][4]

Clinical Course.

A sudden and unexplained fever usually marks the onset. This continues for two, three or even five days, at a level of 102° to 103° F., perhaps with slight morning remissions. The febrile stage ends suddenly, usually by crisis. As the temperature falls to normal, or within twenty-four hours or so thereafter, a rubelliform rash appears over most of the body. This rash remains for two or three days, during which the infant is afebrile and otherwise well.

Symptoms.

Symptoms during the pre-eruptive stage vary. Many children remain surprisingly well, and this absence of symptoms during the course of an unexplained high fever seems to be one of the features of the disease. However, some cases are more worrying. There may be transient vomiting at the onset, or slight diarrhœa. There is often extreme restlessness at night, with cries as of sudden pain, and most alarming of all, there may be convulsions, a tense fontanelle, and a simulation of meningitis.

The rash is the final expression of the disease. It is indistinguishable from that of rubella, but while the trunk and proximal parts of the limbs are well covered, the face remains relatively free. The duration of the rash may be from a few hours to two or three days, and it disappears without pigmentation or desquamation.

Enlargement of the occipital glands may occur, but it is often not noticeable.

The Blood Picture.

The blood count shows characteristic changes during the course of the illness—namely, leucopenia with relative lymphocytosis. The leucopenia is progressive, the total white cell count reaching its lowest level (which may be as low as 1800 per cubic millimetre) at the end of the pre-critical fever. After the appearance of the rash it rapidly rises to normal. The relative lymphocytosis is even more constant than the reduction in the white cell count, and persists as a rule into the period covered by the rash—that is, while the total white cell count is returning to normal. Values of 80% to 90% are usual.

Complications.

Most writers stress the complete absence of complications, but one case has been reported as complicated by hemiplegia, which disappeared completely after ten weeks. Secondary encephalitis was considered the most likely cause.[5] No fatal cases have been reported.

Diagnosis.

The diagnosis presents two problems—the recognition of the condition during the febrile period and the distinction from measles or rubella after the rash has appeared.

Before the appearance of the rash, diagnosis depends largely on the blood picture and its association with absence of physical signs to account for fever in a child aged under two to two and a half years. Neither of these factors is reliable or specific, and therefore it would seem that diagnosis at this stage can be "presumptive" only.

The rash may be mistaken for measles, in which also a pre-eruptive fever occurs. However, in measles the fever rises and accompanies the rash for some days, and further, the catarrhal symptoms and Koplik's spots are absent in roseola. It is more likely that the rash will be mistaken for rubella. This disease, however, occurs in epidemics which involve adults as well as children, it affects older children rather than infants, and there is no prolonged fever before the eruption. The rash on the face is pronounced in rubella, but indistinct or absent in roseola. The variation in the degree of enlargement of retro-auricular and occipital glands is probably of little help, and while the blood picture is somewhat similar in the two diseases, plasma cells are said to be much more numerous in rubella.

The most important distinguishing features of *roseola infantum* are the time relation of fever and rash, and its occurrence in young infants.

Treatment.

Treatment is entirely symptomatic. Chemotherapy is not indicated, though it may be employed while the diagnosis is in doubt. Isolation is necessary only from infants in the susceptible age group.

Case Reports.

The first two case reports show the puzzling and often alarming features that may accompany the pre-eruptive stage. The remainder, which are reported in less detail, have been selected as being more typical.

CASE I.—The patient was a girl, aged nine months. She had had no previous illness. Both parents were well, but her brother, aged two and a half years, had nineteen days previously had an unexplained fever lasting for forty-eight hours. After a day in which the child seemed quite well, the mother noticed that sleep was disturbed and the child was hot. She seemed better next morning, but during the day became feverish and fretful and at night was again restless. Next day she was still feverish, and in the afternoon, the temperature being 102° F., the mother sent for her doctor. There was no vomiting, the bowels acted normally, and though disinclined for solids the child took milk well.

On examination of the patient at 4.30 p.m., nothing could be found to account for the rise in temperature to 102·2° F. There was no suggestion of upper respiratory tract infection, no Koplik's spots were present, and no injection of the conjunctivæ was noticed, and occipital and retroauricular glands were not palpable. However, tenseness of the fontanelle was present; but as there was no neck stiffness, and as the general picture did not suggest meningitis, it was thought that the child could safely be left at home, and sulphadiazine was prescribed.

The child was put to bed at 6 p.m., and though hot, seemed contented and went to sleep quickly. At 6.45 p.m. the mother heard the child making a "grunting" noise, and found her "with her mouth full of froth, and stiff all over". When examined by her doctor about twenty minutes later she was uttering repeated short cries and seemed unaware of her surroundings, and the arms were flexed at the elbows. It was noticed that the fontanelle became tense only with each cry. No neck stiffness was present.

She was taken to hospital at once, and on the way thither the crying continued and the child perspired profusely. On her admission to hospital at 8 p.m. her temperature was 100° F. A lumber puncture was performed at once, yielding a clear fluid under normal pressure. The child then became quiet and slept peacefully throughout the night. The temperature was 99° F. at midnight and 4 a.m. and 98·2° F. at 8 a.m.

Throughout the next day her temperature remained normal, and the child seemed bright, active and happy. In the report on the cerebro-spinal fluid it was stated that one white cell per cubic millimetre, sugar and a trace of globulin were present. Unfortunately no blood count was made at this stage.

On the following morning—that is, twenty-four hours after the temperature had fallen to normal—the child was slightly more fretful than on the previous day, and a rash

resembling rubella was appearing on the body, most pronounced on the back. The temperature was 98° F. Enlarged glands could be palpated on the mastoid processes, but not elsewhere.

During the next twenty-four hours the rash became more profuse over the trunk and proximal parts of the limbs. On the back it was confluent, but elsewhere was indistinguishable from rubella. There was little rash on the neck, while on the forehead and face there was scarcely more than an obvious flushing. The rash remained in this condition for twenty-four hours, then faded rapidly and had disappeared without trace in twelve hours—a total duration of two and a half days. During the whole of this time the temperature remained between 97° and 98° F.

A blood count made on the first day of the rash showed a total white cell count of 7000 per cubic millimetre; 17% were neutrophile cells, 82% lymphocytes and 1% large mononuclear cells.

On the information available it is uncertain whether this child had an unobserved convulsive seizure at the time of the crisis, or whether a seizure merely threatened. Convulsions reported in connexion with *roseola infantum* have usually occurred at the onset, as described in Case II.

CASE II.—The patient, a boy, aged seven months, was admitted to hospital at 6.15 a.m. in convulsions. There had been one short seizure the previous evening, and he had been restless during the night. He had had no previous illness, and both parents and three older children were in good health. On his admission to hospital, his temperature was 101° F. The child was in convulsions and cyanosed, but no abnormality could be found in the abdomen, chest, throat or ears. The fontanelle was bulging, but owing to the convulsions, neck stiffness could not be determined.

A lumbar puncture was performed at once; the fluid was clear and under normal pressure. The convulsions then ceased. After two hours the child again began to have convulsions. Lumbar puncture was repeated without effect, and twitching of the limbs and cyanosis continued for nearly three hours. During this time oxygen was administered continuously and repeated intramuscular injections of phenobarbitone were given, and finally the convulsions ceased and the child slept. At 4 p.m. the temperature was 99° F., but at 8 p.m. it was 101·8° F. The child remained quiet during the night.

At noon on the day after his admission to hospital the temperature was 103° F. No cause for this could be found, and the child seemed reasonably well. At 4 p.m. and 8 p.m. the temperature was 101° F., and at midnight it had fallen to 99° F.

On the following day the temperature was normal, and a rubelliform rash was appearing on the trunk. The child seemed well, no coryza and no Koplik's spots were present, and no occipital or retro-auricular lymph glands were palpable. The rash increased in intensity during the next twenty-four hours, but involved only the trunk and proximal parts of the limbs. It faded without trace after thirty-six hours. During this period the child was bright and happy and the temperature remained between 97° and 98° F. The cerebro-spinal fluid was normal in all respects.

A blood count on the third day of the illness—that is, at the time of maximum temperature rise and immediately before its fall—showed a total white cell count of 5400 per cubic millimetre, 66% being neutrophile cells and 34% lymphocytes. On the following day—that is, when the rash was appearing—the total white cell count was 7000 per cubic millimetre, 46% being neutrophile cells and 54% lymphocytes.

CASE III.—A boy, aged two and a half years, had been irritable and disinclined for food for twenty-four hours. Some vomiting had occurred and his sleep was disturbed. On the second day of illness the temperature was 104° F., the fauces were congested and occipital glands were palpable. Otherwise no abnormality could be found. On the third day the temperature was again 104° F., and there was no change in the physical findings. On the fourth day the temperature had fallen to normal, and a rubelliform rash appeared. The temperature remained normal thereafter, and the rash cleared in a few days.

CASE IV.—The patient, a boy, aged nineteen months, was a cousin of the child whose case was described in Case III. There had been no direct contact, but both children were frequently in contact with the same relatives. On the day following the onset of his cousin's illness this boy became feverish. No vomiting occurred, but he refused food and was very restless at night. On the second day the temperature was 102° F., and it continued between 102° and 104° F. until the fourth day of illness. During this time some enlargement of the posterior cervical lymph glands was noticed, but otherwise no abnormality could be found. No cough, no conjunctivitis and no Koplik's spots were present, nor was there any evidence of upper respiratory tract infection. On the fifth day the general condition was improved and the temperature was normal. Towards evening a rubelliform rash appeared on the body, and later spread to the proximal parts of the limbs. There was slight involvement of the face. The rash persisted for about three days and then faded without trace. During this time the temperature remained normal and the child was contented and took food well.

Comment.

It seems probable that *roseola infantum* is more common among young infants in Australia than is generally realized, and that many cases may have been misdiagnosed as rubella. In view of the increased significance now attached to rubella, differentiation of the two diseases assumes a new importance, for the appearance of roseola in a young infant may well take place during the early months of the mother's succeeding pregnancy.

An alternative possibility is that the disease has not in fact appeared hitherto in Australia, and this possibility would seem to be supported if the syndrome has not been recognized in children's hospitals. Although it is essentially a disease of domiciliary practice, patients affected as in the first two cases described above must have been admitted to hospital for investigation and treatment. A search through the Mater Misericordiæ Children's Hospital records of patients discharged with a final diagnosis of measles or rubella during the last five years has revealed no cases in which the clinical course has been suggestive of roseola. However, it is likely that in cases such as those described treatment with sulphonamides would have been given, and a rash appearing after the fall of temperature may well have been ascribed to this form of therapy. Such cases would be almost impossible to trace among hospital records.

Summary.

1. A brief account of *roseola infantum* is given, and cases showing its various features are described.

2. The disease, which occurs almost exclusively in infants under the age of two and a half years, is characterized by an unexplained high fever lasting for a few days, and an exanthem indistinguishable from that of rubella which appears after the temperature has fallen to normal.

3. During the course of the illness, leucopenia and relative lymphocytosis are present.

4. The differential diagnosis from other exanthemata is discussed. The most important distinguishing features of *roseola infantum* are the time relation of fever and rash, and its occurrence in young infants.

5. It is suggested that *roseola infantum* may be more common in Australia than is generally realized, and that the rash may have been wrongly ascribed to rubella. Differentiation from rubella is of increasing importance.

Acknowledgements.

I am indebted to Dr. A. W. St. Ledger and Dr. Lorimer Walker, who have allowed me access to their case records.

References.

(1) Zahorsky, J. (1948), "Roseola Infantum", "Brennemann's Practice of Pædiatrics", Volume II, Chapter 21.
(2) Moore, O. M. (1945), "Roseola Infantum", *Journal-Lancet*, Volume LXV, page 243; abstracted in "The 1945 Year Book of Pediatrics", page 94.
(3) Harries, E. H. R., and Mitman, M. (1947), "Clinical Practice in Infectious Diseases", Third Edition, page 274.
(4) Barenberg, L. H., and Greenspan, L. (1939), "Exanthema Subitum (Roseola Infantum)", *American Journal of Diseases of Children*, Volume LVIII, page 983.
(5) Rosenblum, J. (1945), "Roseola Infantum (Exanthema Subitum) Complicated by Hemiplegia", *American Journal of Diseases of Children*, Volume LXIX, page 234.

Addendum.

Zahorsky, in the article referred to,[1] states that while typical attacks of roseola do occasionally occur in older children, less than a score of cases in children over the age of four years have been reported. In his own series

of over 400 cases the oldest patient was aged fourteen years and another was nine years old. He adds that these older children may complain of headache or abdominal pain.

Such a patient was admitted to the Mater Misericordiæ Children's Hospital after the foregoing paper was written, and the case seems worth recording as a further example of the puzzling pre-eruptive manifestations of the disease.

A girl, aged six years, had been ill for three days with fever and vomiting. She had some abdominal pain, and on the fourth day this became severe and she also complained of headache. She was taken to hospital, and on examination her temperature was 101° F. She was tender in the epigastrium and in the right side of the abdomen, and as there seemed also to be some muscle guarding, she was admitted to hospital with a provisional diagnosis of appendicitis. No other abnormal signs were found.

The temperature rose to 103° F. on the day of her admission to hospital, but fell during the night, and it was 98° F. at 4 a.m. and 8 a.m. next day. As the day progressed the temperature again rose to 101° F. at 4 p.m., but subsided to 98·6° F. at midnight and remained at or slightly below this level thereafter. There was no further abdominal pain or vomiting, and no further abnormality could be found on physical examination.

Next day, the sixth since the onset, the temperature remained normal and the child seemed well. A blood count revealed leucopenia, the total white cell count being 3600 per cubic millimetre, 54% of the cells being neutrophile cells, 44% lymphocytes and 2% eosinophile cells.

On the seventh day a rash typical of roseola appeared on the trunk. The spots were rather diffuse on the front of the chest and abdomen, but much more marked on the back. There was no involvement of face, neck or limbs. There were no palpable glands, no coryza, and no Koplik's spots, but a few small hæmorrhagic patches were seen on the palate and buccal mucous membrane. The temperature remained normal, and the child was in no way upset. The total white cell count was 5200 per cubic millimetre, 56% of the cells being neutrophile cells, 43% lymphocytes and 1% eosinophile cells.

On the eighth day the rash was fading. The total white cell count was 5800 per cubic millimetre (48% neutrophile cells, 52% lymphocytes).

The rash had entirely disappeared by the ninth day, and there was no further change in the child's condition.

Reports of Cases.

REPORT OF A CASE OF TUBERCULOUS MENINGITIS TREATED WITH STREPTOMYCIN.

By I. S. BOOTH,
Sydney.

Clinical Record.

L.L., a six-year-old girl, was admitted to the Royal Alexandra Hospital for Children, Sydney, on September 22, 1947. She was an only child and her father had died from pulmonary tuberculosis in September, 1944. Other than morbilli in September, 1946, the patient had had no previous illness. Because of the family history of tuberculosis the child had been under observation from 1941 till 1946. An X-ray examination in 1941 revealed "enlargement of paratracheal glands, almost certainly tuberculous", and further X-ray examination in 1942 showed "slight glandular swelling with some dulness of the right hilum, probably primary". The result of a Mantoux test in 1943 was positive, but all further X-ray appearances were considered normal.

During the week prior to admission to hospital the child had become drowsy, had developed anorexia, and would take large quantities of water only. She had vomited on two occasions. The bowels had been constipated for five days. The day before admission the patient found difficulty in expressing herself, and her speech was difficult to understand. At this time her legs would not support her, and loss of power was noticed in both upper limbs. On the day of admission there had been a change in personality for a period, during which the child was unmanageable. In spite of these later developments, the mother reported that the child had been eating more, had had no vomiting, and had not been so drowsy during the three days before her admission to hospital.

On examination in hospital the patient was well developed but somewhat undernourished. She was drowsy most of the time, and on being roused was very irritable and antagonistic. However, she answered simple questions intelligently, but the intonation of her speech changed rapidly during conversation. There was a slight weakness of the right lower part of the face and of the right external rectus muscle. She had moderate neck stiffness and a "positive" spine sign. No weakness was detected in the upper or the lower limbs. The systolic blood pressure was 100 millimetres of mercury and the diastolic pressure 80 millimetres. The tonsils were present and inflamed. No abnormality was detected in the heart, lungs or abdomen. The head circumference was 19 inches. The temperature was 102·8° F., the pulse rate 96 per minute and the respiration rate 20 per minute.

TABLE I.

Date.	Streptomycin Levels. Units per Millilitre.	Hours after Last Streptomycin Injection.		Intramuscular Dose Streptomycin. Units Four-Hourly.	Intrathecal Dose Streptomycin. Units Daily.
		Intrathecal.	Intramuscular.		
29/9/47 ..	8–16	12	¼	100,000	50,000 × 2
30/9/47 ..	16–32	15	3	100,000	50,000 × 2
1/10/47 ..	8–16	14	2	100,000	50,000 × 2
2/10/47 ..	16–32	12¼	¼	100,000	50,000 × 2
3/10/47 ..	32–64	12¼	1¼	100,000	75,000 × 2
6/10/47 ..	32–64	10	3	100,000	50,000 × 2
8/10/47 ..	32–64	17	2	100,000	50,000 × 2
9/10/47 ..	16–32	15¼	2	100,000	50,000 × 2
10/10/47 ..	8–16	17	1	100,000	50,000 × 2
11/10/47 ..	8–16	18	3	100,000	50,000 × 1
13/10/47 ..	16–32	24¼	2¼	100,000	50,000 × 1
14/10/47 ..	8–16	25¼	¼	100,000	50,000 × 1
16/10/47 ..	16–32	22	1	100,000	50,000 × 1
17/10/47 to 22/10/47	8–16	24	3	100,000	50,000 × 1
28/10/47 ..	<8	38	1	100,000	50,000 × 1
2/12/47 ..	8–16	—	2	100,000	—
9/12/47 ..	4–8	7 days	1	100,000	—
16/12/47 ..	4–8	14 days	1¼	100,000	—
30/12/47 ..	None	28 days	13 days	—	—

Examination of the blood revealed a red cell count of 5,120,000 per cubic millimetre with a hæmoglobin value of 14·5 grammes and a white cell count of 12,000 per cubic millimetre, the differential count being 70% neutrophile cells, 19% lymphocytes and 6% monocytes. The spinal fluid on admission was cloudy and contained 235 cells per cubic millimetre, 40% of which were polymorphonuclear leucocytes. The total protein content was 90 milligrammes per 100 millilitres and the chloride content 690 milligrammes per 100 millilitres, the sugar content being more than 25 milligrammes per 100 millilitres. No organisms could be seen, and no clot formed on standing. However, a thin "bridal veil" clot formed in the specimen of cerebrospinal fluid taken two days after admission to hospital (September 24, 1947), and acid-fast bacilli were seen in the smears prepared from this. Culture on Petragnani medium produced a light growth of *Mycobacterium tuberculosis* after twenty-six days' incubation (October 20, 1947). A guinea-pig inoculated with this culture was found *post mortem* to have extensive tuberculous lesions in the liver, spleen, peritoneum and abdominal lymph glands. The results of Mantoux skin tests with 1:100 and 1:1000 dilutions of tuberculin were positive. The chest on X-ray examination on two occasions appeared normal, and repeated examination of the *fundi oculorum* showed no evidence of chorioid tubercles.

Streptomycin therapy was commenced five days after admission to hospital (September 27, 1947). The dosage of streptomycin given intramuscularly was 100,000 units four-hourly (0·8 gramme daily) for eighty-two days, that is, to December 17, 1947, a total of 48·6 grammes. The

dosage of streptomycin given intrathecally was 50,000 units twice daily for seven days, the interval between intrathecal injections then being gradually lengthened over two days to complete the change over from 50,000 units twice daily to 50,000 units daily, and the 50,000 units being then continued daily for a further twenty days (that is, to October 31, 1947), a total of 2·2 grammes. Two further intrathecal injections of streptomycin were given in November and December when progress lumbar punctures were performed, making the total amount of streptomycin given intrathecally 2·3 grammes. This dosage of streptomycin maintained a cerebro-spinal fluid concentration of approximately 16 to 32 units per millilitre, with occasional readings of 32 to 64 units and of 8 to 16 units. (See Table I.)

During the five days preceding the commencement of streptomycin administration there was a variable degree of irritability and drowsiness with disinclination for solid food and occasional attacks of vomiting. The paresis of the external rectus muscle increased, but the weakness of the right lower part of the face remained minimal. The temperature varied between 100° and 103° F.

Following commencement of streptomycin therapy there was noticeable clinical improvement in two days and much clinical improvement in five days. During the first five days the patient showed little resentment at the twice-daily lumbar punctures and the intramuscular injections, but after the fifth day she struggled against the treatment; she was more alert mentally and answered questions quickly and readily. From the tenth to the twentieth day of treatment the clinical condition deteriorated somewhat; the patient became irritable and uncooperative again and had periods when she was completely disorientated. The paresis of the external rectus was becoming less evident until by the thirty-fourth day of treatment (November 1, 1947) the results of clinical examinations were essentially negative. The irritability was now confined entirely to the times of the operation of lumbar puncture, the child being quite contented within five minutes of the operation, and neck stiffness, which had varied in degree up till this time, could no longer be demonstrated. The temperature fell slowly after commencement of streptomycin therapy, varying between 99° and 101° F. the first week and then showing occasional sharp rises to 100° F. until the fifth week of the therapy, when it became normal; it remained normal during the remainder of the illness. With the commencement of streptomycin therapy the protein content of the cerebro-spinal fluid rose, the maximum reading occurring on the sixty-sixth day (December 2, 1947). The cellular content of the cerebro-spinal fluid also rose to its highest level on the nineteenth day (October 16, 1947). From these two dates the levels gradually fell to normal, the first absolutely normal findings being obtained on June 16, 1948 (see Figure I). In the course of the illness twelve specimens of cerebro-spinal fluid were examined bacteriologically by smear and culture for *Mycobacterium tuberculosis* and all results were negative after the initial positive result. The guinea-pig inoculated on June 16, 1948, was killed in August, 1948, and there was no evidence of tuberculous infection.

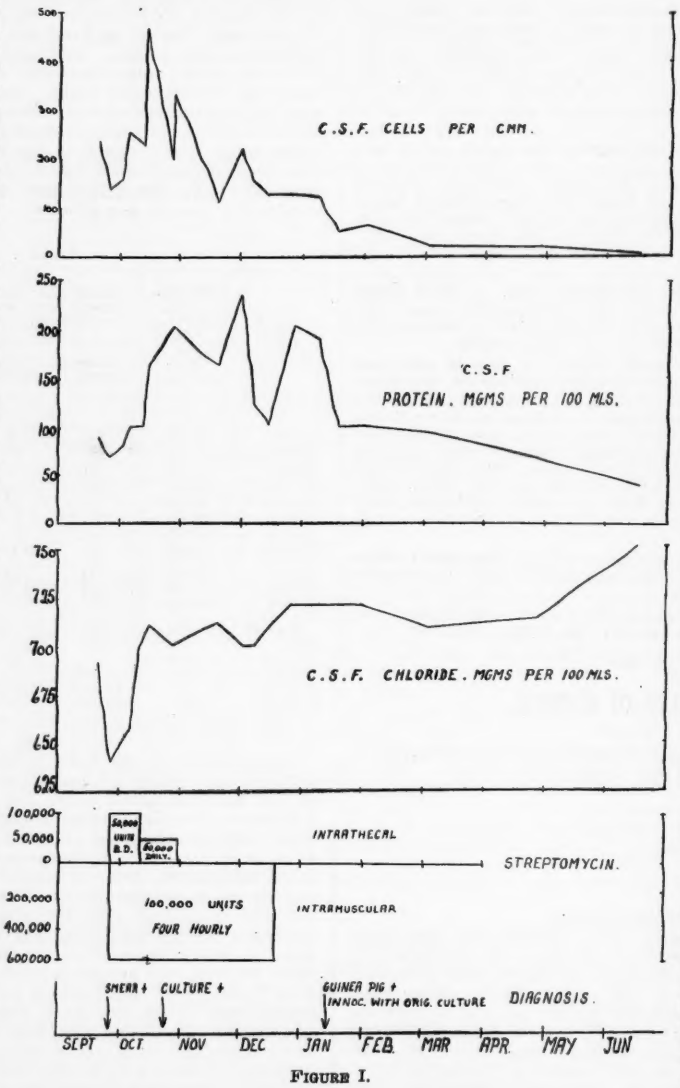
C.S.F. CELLS PER CMM.
C.S.F. PROTEIN. MGMS PER 100 MLS.
C.S.F. CHLORIDE. MGMS PER 100 MLS.
INTRATHECAL STREPTOMYCIN.
100,000 UNITS FOUR HOURLY
INTRAMUSCULAR
SMEAR + CULTURE +
GUINEA PIG + INNOC. WITH ORIG. CULTURE
DIAGNOSIS.
SEPT OCT NOV DEC JAN FEB MAR APR MAY JUN

FIGURE I.

The child was allowed to sit up in a chair on the sixty-ninth day (December 5, 1947) and gradually allowed increasing activity until she was discharged from hospital clinically normal on the eighty-seventh day (December 23, 1947). She was readmitted after twelve days for progress lumbar puncture. At this time clinical examination showed no abnormality. The mother reported that the girl had been well while at home except that she became "emotional and upset over very little". Her behaviour while in hospital under observation for thirty-six days on this occasion was that of a normal six-year-old girl. She was then transferred to the Convalescent Home, where her behaviour away from maternal influence could be watched. Her behaviour at the Convalescent Home was entirely satisfactory. A psychiatric consultation in March, 1948, showed the child to be normal except that she had been thoroughly spoilt since her illness.

Comment.

Twelve months after the original admission to hospital and nearly nine months after the cessation of streptomycin administration this child appears to be cured clinically, and, as far as can be determined by microscopic, bacteriological and biochemical study of the cerebro-spinal fluid, there is no evidence of the tubercle bacillus.

Throughout treatment there was no indication of any toxic effects from streptomycin, although tests for high-tone deafness were not carried out especially.

The dosage of streptomycin used in this case, 100,000 units given intramuscularly every four hours (approximately 20,000 units per pound of body weight per day) and 50,000 units given intrathecally every twelve hours for nine days, followed by 50,000 units daily for a further four weeks, has been modified during the twelve months since this treatment was commenced, and evidence now being gathered indicates that daily, if not two-daily, intrathecal injections are satisfactory and that streptomycin may be given intramuscularly at twelve-hourly or twenty-four-hourly intervals and a satisfactory concentration of the drug in the blood and cerebro-spinal fluid maintained.

It is interesting to note that a streptomycin level of four to eight units was maintained in the cerebro-spinal fluid in this case for a period of twenty-one days by use of the intramuscular route alone.

Acknowledgements.

I wish to thank Dr. Lorimer Dods, under whose care this child was admitted to hospital, for permission to publish this report, and also Dr. Stephen Williams for his interest and cooperation in the bacteriological studies and estimations of streptomycin levels in the cerebro-spinal fluid.

ARRHENOBLASTOMA OF THE RIGHT OVARY.

By PHILIP C. THOMAS, M.R.C.O.G.,
Perth.

MASCULINIZING tumours of the ovary have for many years afforded a fascinating subject for study by clinicians and laboratory workers. Some idea of their rarity is gained by the fact that according to Novak only about 80 cases have thus far been reported, most of them arrhenoblastomata. This latter term is applied to those tumours which originate in certain male-directed cells persisting in the ovary from the early stages of gonadogenesis, the resulting tumours often exhibiting masculinizing effects upon the patient. The degree of differentiation or dedifferentiation is an important factor in determining the extent of endocrine function. At one extreme is the highly differentiated tumour, originally described by Ludwig Pick (1905) and designated testicular adenoma, in which reproduction of the testicular apparatus in the ovary is quite perfect; while on the other hand the highly undifferentiated variety closely resembles sarcoma, sometimes not revealing its true histogenesis to even the most expert histological examination.

In the circumstances, therefore, it was thought that the following case, which presents this interesting condition, was worth recording.

Clinical Record.

Miss M.F., aged seventeen years, sought medical attention from her family doctor in October, 1947, because her menses, quite normal until three months before, had become characterized by a diminution of the flow. This was followed by complete cessation. The doctor prescribed "gland tablets for a month", but the amenorrhœa persisted.

In January, 1948, her voice changed during the course of a few days to a deep basso, and an acneiform rash appeared about the face, chest, arms, thighs and back. She became conscious of a fine downy fur upon the face, although actually in this respect her skin was normal. About this time, too, she noticed prolongation of pubic hair towards the umbilicus (*android distribution*), and twice in the previous twelve months she had shaved her legs "because the hairs were getting too thick". Generally speaking, however, hirsutism was not a feature.

Because of her voice changes and nine months of amenorrhœa, she came to the Royal Perth Hospital on March 15, 1948, and was first referred to a specialist for larynx examination. The larynx being normal she was referred to the gynæcological clinic "for gland treatment". At this clinic it was found that, although there was no alteration in the breasts or bodily configuration, there was a definite, although not great, hypertrophy of the clitoris, and being a *virgo intacta* she was referred for admission for pelvic examination under anæsthesia and possibly laparotomy. An X-ray examination of the *sella turcica* revealed no abnormality. It should be mentioned at this juncture that facilities for the urinary assay of 17-ketosteroids are not readily available in this city, a shortcoming which it is hoped will be rectified in the near future.

On May 13, 1948, pelvic examination under general anæsthesia revealed a mobile tumour about the size of a billiard ball in the posterior fornix; the uterus was anteverted and its cavity six centimetres in length. The case was regarded provisionally as one of virilism due to ovarian tumour, and laparotomy was performed forthwith. The uterus and left adnexæ were macroscopically normal, but the right ovary was completely replaced by a tumour,

FIGURE I.
Arrhenoblastoma of the ovary.

which felt semisolid, almost cystic. A right salpingo-oophorectomy was performed. Convalescence was uneventful.

This case was fairly typical in that it presented the phases of defeminization and masculinization occurring in that order, and from now onwards one may anticipate that the signs and symptoms will disappear in the order of their appearance, the later-appearing positive features of masculinization being the last to go, though often, according to the literature, incompletely.

Actually, and to the patient's great delight, her menses recommenced exactly four weeks after the removal of the tumour, which apparently is fairly typical post-operative behaviour. In view of this patient's age conservative treatment appears to be fully justified, but periodic pelvic examination for several years will be necessary in view of the possibility of malignant changes and local recurrence.

Description of the Tumour.

The tumour (Figure I) weighed in the fresh condition 79·2 grammes, and its measurements were 63 millimetres by 45 millimetres by 45 millimetres in the non-fixed state. It was surrounded by a tough, whitish-grey, glistening connective tissue capsule. Its cut surface had a mottled appearance, areas of brownish-grey colour being interspersed with yellow circumscribed spots, and groups of punctate extravasations of blood were seen. Its texture and colour as a whole appeared not unlike those of a testicle. On the whole, the cells appeared to be arranged in faintly meandering cell groups. No cyst formation was found. Numerous sections were taken from different parts of the tumour. The general pattern of its microscopic structure

appeared rather uniform throughout. No definite attempts at tubule formation were seen. Two varieties of cells made up the tumour. Cells of the first variety, more clearly defined and apparently of a more mature character, resembled interstitial cells. They had a pink granular cytoplasm with well-defined cell outlines. They usually occurred in groups or cords, and only occasionally were they merging into the second more numerous cell group. The nucleus of the interstitial cells was round and rather small in proportion to the size of the cell itself. It had a definite nuclear membrane and one to three nucleoli of varying sizes. These cells, where they occurred in numbers, corresponded to the small yellowish areas of the macroscopic specimen. Cells of the second variety were quite different. They also had a definite pattern. While the first described variety was more of a syncytial nature, the arrangement of the second was that of a network, in the meshes of which other similar cells were found. They were in other words arranged in long thin cords and whorls. As already stated no true tubules were formed. The cells were oval, in the cords almost spindle-shaped, in the whorled groups centrifugally orientated as a rule. The nucleus was dense and had a distinct membrane. Nucleoli were not conspicuous. The cytoplasm was faintly granular and the cell outlines were indistinct.

The tumour seems to belong to an intermediate group of arrhenoblastoma. No adenomatous structures were found; on the other hand the interstitial cells appeared quite mature.

Acknowledgements.

I should like to record my thanks to Dr. T. R. Lubbe, pathologist at the Royal Perth Hospital, and his technician, Mr. J. S. Scott, for preparing and reporting on the laboratory specimens, and to Dr. H. F. Bettinger, Director of Pathology at the Women's Hospital, Melbourne, for his personal communication relating to the microscopic section of the tumour.

ACCIDENTAL AIR EMBOLISM IN A BLOOD DONOR.

By K. MELVILLE KELLY,
Hobart.

THE MEDICAL JOURNAL OF AUSTRALIA has twice reported cases of air embolism in a blood donor, once due to a faulty Higginson syringe[1] and once due to occlusion of the air-outlet needle by a piece of rubber from the rubber bung of the "Soluvac" bottle.[2] A case is described with a slightly different mechanism, which occurred at the blood bank in Hobart.

Clinical Record.

The donor, a young girl, had good veins, no trouble was experienced in venepuncture, the needle passing well into the lumen of the vein, and a flow of blood commenced at a fairly fast rate. After about a minute the flow slowed and finally ceased; the donor was instructed to squeeze the roll of gauze provided for the purpose, and each time she did so a spurt of blood was seen to enter the "Soluvac" bottle. This continued for a minute or so, no blood being obtained during the intervals of relaxation of the arm, and it was decided to withdraw the needle altogether.

As the manometer cuff pressure was released a hiss of air bubbles in the tube to the "Soluvac" bottle was heard. The needle was quickly whisked out of the vein and a quantity of air and bubbles of blood continued to spurt from the needle.

The donor immediately complained of a tightness in the centre of the chest and gave a slight cough. Her pulse and colour remained normal, and outwardly she did not look alarming in any way. Auscultation revealed no abnormality.

She was kept resting for about an hour, when the discomfort in the chest had practically disappeared, and was then transported home and instructed to rest. Inhalations of oxygen were given, to facilitate elimination of nitrogen bubbles from the blood-stream. She reported no further trouble.

Comment.

The case mentioned by McLean[2] had been noted, and it was thought that this could not happen here, as our routine is a little different.

Our procedure is to perforate the bung with the air-vent needle, attached to a "bung perforator" handle, to which a reversed Higginson's bulb is then connected; the needle on one end of the delivery tube is then pushed into the "Soluvac" bottle via the hole provided, and sodium citrate solution is aspirated into the bottle by the suction of the Higginson's bulb, it being thus proved that the whole system is working correctly and that there is no blockage. The air-vent needle attached to the rather heavy "bung perforator" must therefore have become dislodged and thus occluded the air exit. Naturally the pressure in the bottle built up to something greater than ordinary venous pressure, and when the manometer cuff was released, the air was forced back into the vein.

There were only about 80 millilitres of blood in the bottle, and it is estimated that the amount of air which entered the donor was not more than 30 millilitres and probably much less.

Limited supplies of helium are now available in Australia, and inhalations of this gas would be more efficacious than the oxygen.

The air-vent needles supplied as "Soluvac" equipment are rather short and only just fit inside the "bung perforator" when not in use. It is suggested that longer needles should be used, as it is not essential that they should be stored inside it.

A final note may be of interest. It has been said that experiments conducted in German concentration camps indicate that considerable quantities of air may be injected intravenously without fatality if the patient is lying on his left side in order to confine the air to the right side of the heart as far as possible.

References.

(1) V. J. Kinsella: "A Blood Transfusion Accident", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, 1941, page 690.

(2) John A. McLean: "A Note on the Possibility of Air Embolism in a Blood Donor", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, 1943, page 162.

Reviews.

CANCER OF THE ŒSOPHAGUS.

WITHIN the last decade the radical treatment of carcinoma of the œsophagus has passed from the outer darkness of "virtual euthanasia" into the realm of practical surgical politics. George T. Pack has collected into one volume a "Symposium on Cancer of the Esophagus and Gastric Cardia", comprising about a dozen individual contributions on diagnosis and treatment which appeared originally in the June, 1948, issue of *Surgery*[1]. Multiple authorship inevitably leads to some overlap, and also to the expression of different points of view, but the essays presented here stem from practical experience and cover the subject very fully, though one looks in vain for at least one account of the problem as it concerns the anæsthetist.

Modern progress in the resection of œsophageal growths received its greatest impetus from the successful employment by Adams and Phemister in 1938 of œsophago-gastric anastomosis, by which the mobilized stomach was brought up into the chest to reestablish alimentary continuity. Earlier attempts to restore this by the construction of various types of epithoracic œsophagus had rarely succeeded (or been completed before the patient died of metastases). In the volume under review it is stressed that results in surgery of the œsophagus depend on the application of a detailed knowledge of the anatomy and physiology of the region. The œsophagus requires to be handled with more gentleness

[1] "Cancer of the Esophagus and Gastric Cardia", edited by George T. Pack, B.S., M.D. (New York); 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¼" × 6¼", pp. 196, with 25 illustrations. Price: 37s. 6d.

than any other portion of the alimentary tract, as it lacks a serous coat and its largely longitudinal musculature does not hold sutures well. Tension on the anastomosis must be avoided, and the latter must be no further than two or three centimetres below the next highest vessel, as the blood supply of the œsophagus is strictly segmental. These and other practical points are discussed in the descriptions of the technical methods applicable to growths at different levels in the gullet, and reference is made to the right transthoracic approach pioneered by Ivor Lewis in Britain. The pre-operative and post-operative management of the patient are dealt with, emphasis being laid on the need for attention, *inter alia*, to nutrition, reexpansion of the lung, the prevention of infection, and early ambulation. One writer recommends checking the reexpansion of the lung by daily X-ray examination with a portable machine.

"Cancer of the Esophagus and Gastric Cardia" presents an up-to-date account of the subject, and should be in the hands of every surgeon interested in this work who is not already in possession of the June, 1948, issue of *Surgery*.

A YEAR BOOK OF THERAPEUTICS.

ANY medical practitioner will find "The 1948 Year Book of General Therapeutics" of interest and value for browsing, careful study or special reference.[1] Like its predecessors it has been designed by its editor, Oscar W. Bethea, to include only matter of practical clinical value. The outstanding impression left by the book is that of the healthy progress being made by therapeutics in modern medicine. A wide field of literature and many aspects of treatment are covered in this book, but it contains little that does not merit serious attention and much to revive the interest of those who have grown cynical of therapeutic claims. The editor has not hesitated to present both sides of controversial questions, and with sincere albeit discreet humility is restrained in his own comments, declining to assume "the role of judge in the realm of medical knowledge". He has been discriminating in his choice of material and then largely left it to be assessed on its own merit. The book opens with a short section on general therapeutic technique. A section on the sulphonamides helps to put these drugs in their right perspective; recent work on sulphone drugs in leprosy receives attention. The space allotted to antibiotics is naturally considerable; as well as penicillin and streptomycin, the value of newer drugs, such as aureomycin and chloromycetin, is discussed. Sections on amœbicides and antimalarials are followed by one on antirheumatics largely taken up with gold therapy and the use of BAL. Then follow sections on antibodies and antigens, blood restoratives, vitamins, protein and amino acid therapy, hormones, anæsthetics, sedatives, hypnotics and antispasmodics, antithyreoid drugs, histamine and antihistaminic agents, drug treatment of headache, drugs acting on the heart and blood vessels, the treatment of malignant conditions and some miscellaneous subjects. Most of the abstracts are short, but contain sufficient material to be of practical value to the reader without reference to the original sources. The book should be appreciated by all busy practitioners. Its production is as usual beyond reproach.

PRACTICAL ORTHOPTICS IN THE TREATMENT OF SQUINT.

"PRACTICAL ORTHOPTICS IN THE TREATMENT OF SQUINT" by Dr. T. Keith Lyle and Miss Sylvia Jackson has been an essential part of the libraries of ophthalmologists and orthoptists ever since it first appeared. The third edition which has just been published is most valuable.[2] Unfortunately Miss Jackson has retired from active orthoptic work, but her place has been taken by Miss Lorna Billinghurst and Miss Diana Salsbury. One brings the benefit of experience with the Royal Canadian Air Force and the other that from the Women's Royal Naval Service to this edition. This, combined with Keith Lyle's exceptional work, explains the great improvement in the chapters on heterophoria and on acquired paralytic strabismus. His opportunities of studying the latter and the skill he acquired make Dr. Lyle's writings authoritative. The practical side of orthoptics is dealt with in a most comprehensive and able fashion. The authors acknowledge the help they received from seventeen experienced orthoptists. The results are seen in several useful summaries with headings such as "Is the Case Likely to Benefit by Orthoptic Treatment?". Orthoptics has developed to such an extent in England that the course of study has been doubled in length. This work makes one hope that the authors will produce a monograph on squint in all its aspects. The few deficiencies in "Practical Orthoptics" can then be made up. Strange to say, one of these is the absence of any refrence to that not infrequent phenomenon known as alternating hyperphoria.

A YEAR BOOK OF GENERAL MEDICINE.

"THE 1948 YEAR BOOK OF GENERAL MEDICINE" is a plump volume and we wonder how much more this particular member of the Year Book series can expand without needing to undergo some form of fission.[1] The present volume covers a wide range of material and over 900 authors of papers are indexed; the increasing number of significant contributions to medical literature by Continental workers, who are already well represented, will make the selection of abstracts for later volumes increasingly difficult, but it is to be hoped that this will not mean the omission of references to any important work. One short subsection that might well be deleted is that on metabolism and nutrition (in Part V), as these subjects are covered in another Year Book. For the rest, the editors are to be congratulated on the mass of information packed into the book; a minimal amount of space is occupied by editorial comment. The general arrangement of the material is as in the previous volume. The editorship of Part I (that on infectious diseases) has been taken over from George F. Dick by Paul B. Beeson, professor of medicine in the Emory University Medical School. Part II, which deals with diseases of the chest, is still edited by J. Burns Amberson, and George R. Minot and William B. Castle remain editors of Part III (diseases of the blood and blood-forming organs, and diseases of the kidney). Part IV (diseases of the heart and blood vessels) has a new editor, Tinsley R. Harrison, professor of medicine in the South-western Medical College, Dallas, Texas, in place of William D. Strand, and George B. Eusterman continues to edit Part V (diseases of the digestive system and of metabolism). The number of individual subjects and abstracts is too great to allow us to dissect them further, but it may be said that any practitioner of medicine will find something of interest and value in this book. Australian work mentioned includes a paper by F. M. Burnet on cellular infection by influenza and related viruses, and a paper by P. Fantl and Margaret H. Nance on the physiological activation of prothrombin. The book is, as one expects, admirably produced.

CHILD HEALTH AND DISEASE.

ALTHOUGH it is becoming increasingly difficult to encompass the whole range of pædiatrics within the scope of a single volume, "The Child in Health and Disease" represents one of the best attempts to do so we have yet encountered.[2] Pædiatrics differs from all other specialties in dealing not with a single system or section of the body, but with everything that concerns the sick child, being in fact general practice in a particular age group. Moreover, pædiatricians, like other general practitioners, must be concerned with the maintenance of health as well as with the diagnosis and treatment of disease.

Grulee and Eley fully recognize this, and they have included chapters on the common cold and its management,

[1] "The 1948 Year Book of General Therapeutics", edited by Oscar W. Bethea, Ph.M., M.D., F.A.C.P.; 1948. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 482, with 60 illustrations. Price: $4.25.

[2] "Practical Orthoptics in the Treatment of Squint", by T. Keith Lyle, M.A., M.D., M.Chir. (Cantab.), F.R.C.S. (England), and Sylvia Jackson, S.R.N., D.B.O., with the assistance of Lorna Billinghurst, D.B.O.; Third Edition; 1949. London: H. K. Lewis and Company, Limited. 9¾" × 7¼", pp. 288, with 151 illustrations. Price: 35s.

[1] "The 1948 Year Book of General Medicine", edited by Paul B. Beeson, M.D., J. Burns Amberson, M.D., George R. Minot, M.D., S.D., F.R.C.P. (Edinburgh and London), William B. Castle, M.D., S.M., M.D. (Hon.), Utrecht, Tinsley R. Harrison, M.D., and George B. Eusterman, M.D.; 1948. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 826, with 158 illustrations. Price: $4.50.

[2] "The Child in Health and Disease: A Textbook for Students and Practitioners of Medicine", by Clifford G. Grulee, M.D., and R. Cannon Eley, M.D.; 1948. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 10" × 6½", pp. 1084, with many illustrations. Price: 90s.

on immunization procedures, on the psychological aspects of adolescence, on pædiatric ophthalmology, even on children's teeth, as well as the usual sections on medical and surgical diseases of children, infant feeding, and so on. Their book is in consequence a very large one, yet it contains hardly any irrelevant material.

It would be quite beyond the capacity of any one person to write with authority upon the vast range of topics encompassed in this work. The authors may have gone to the other extreme in securing the services of 75 contributors, but their list includes most of the well-known names in American pædiatrics, and in so doing they have scarcely left a medical school or important children's hospital in the United States of America unrepresented.

The result is a really imposing and valuable book. Each of the 91 chapters has been written by an expert, and the information provided is concise, up to date and clearly presented, the emphasis throughout being on practical considerations of problems met in everyday life. References are given at the end of each chapter. Controversial matters are presented fairly without undue dogmatism. The printing is good and there are plenty of illustrations.

In a work of this size it is always possible to find small features to criticize. One could query the authors' lack of enthusiasm for "B.C.G." vaccination for tuberculosis contacts and their statement that (in the treatment of this disease) "cold or fresh air on open porches has been abandoned in favour of controlled ventilation and moisture content"; but in general the book reflects a sound commonsense view on all topics.

It is too large a book for medical students, but well worth the outlay as a reference work for general practitioners, and indispensable for those specializing in children's diseases.

PÆDIATRICS.

IT is unlikely that Zahorsky's "Synopsis of Pediatrics" will find a place amongst those books recommended for students at Australian universities, for it is no better than the more readily available and well-established English works.[1] The authors have, however, succeeded in their object of condensing modern knowledge of pædiatrics into a compact volume. The essential points in symptomatology, diagnosis and treatment of children's diseases confronting the general practitioner are adequately covered and can be checked at a glance. The smooth paper used lends itself to the reproduction of illustrations and Röntgen pictures and the authors' thorough and discriminating selections in this respect enhance the attractiveness of this volume. Coloured semi-diagrammatic plates are used to illustrate mouth and throat manifestations of infectious diseases. It is useful also to have coloured plates of normal and abnormal stools in infancy; this emphasizes for students the value of examination of the excreta. Perhaps some idea of the completeness of the work can be gained if it is mentioned that such subjects as *lipodystrophia progressiva* and amongst the infectious diseases, *roseola infantum*, are adequately dealt with. Naturally, the Zahorskys have some pet ideas of their own, as will be seen in the treatment of rheumatism and their attitude towards circumcision, but there are very few departures from orthodox teaching. The harassed general practitioner will find most use for this ready reference book and the student could do worse than use the volume as a basis for the knowledge gained during his short-lived sojourn at our pædiatric institutions.

BRONCHIOGENIC CARCINOMA AND ADENOMA.

"BRONCHIOGENIC CARCINOMA AND ADENOMA" by B. M. Fried is a comprehensive monograph on a subject which has recently assumed great importance, for in the last twenty-five years it has become with gastric carcinoma the commonest malignant disease of the visceral organs in the male.[2] Its appallingly high mortality can be lowered only by early diagnosis, which implies an increase in the general awareness of the frequency of this disease and a familiarity with its varying modes of onset. Fried's book is therefore of considerable value since it lays great stress on the recognition of the disease in its incipient stages, and is based on a very extensive clinical and pathological experience.

Following chapters on the incidence of bronchiogenic carcinoma and its pathology, the latter well illustrated by plates of gross and microscopic specimens, the author discusses possible ætiological factors. The two succeeding chapters, which are the best in the book, are devoted to the clinical manifestations of the disease, which the author divides into three categories—typical, atypical and silent. A number of illustrative cases of each category are given in detail, complete with skiagrams and biopsy or autopsy specimens. In a concluding note the author rightly stresses the fact that the diagnosis of bronchiogenic carcinoma in the early stages, when it is amenable to treatment, is a problem for the internist and the general practitioner rather than for the "chest or cancer specialist". One cannot condemn too strongly the all too frequent diagnosis of "unresolved pneumonia" in the middle-aged to elderly man.

An interesting chapter is devoted to the enigma of hypertrophic pulmonary osteoarthropathy. No new light is shed on this topic, but Fried holds the view that its cause may not be remote from that of acromegaly and "that here too one is probably dealing with an endocrinopathy (dyspituitarism) caused by a disease that originated in the lungs".

A small portion of the book is allotted to bronchial adenoma and tumours of the mediastinum. The controvesy as to the correct mode of treatment of bronchial adenoma is presented, the author preferring lobectomy, though he admits that some adenomata are confined uniquely to the lumen and thus are amenable to bronchoscopic treatment.

The bibliography at the end of each chapter is extensive, and indicative of the care with which the whole book has been prepared.

HUMAN BIOCHEMISTRY.

THE appearance of the second edition of "Human Biochemistry", by Israel S. Kleiner, should be welcomed by all members of the medical profession desirious of maintaining an up-to-date knowledge of medical biochemistry. Written primarily for students, it would prove illuminating to either graduate or undergraduate interested in biochemistry as an integral part of medicine and not merely as a section of the medical curriculum. As the preface states, an "attempt was made to introduce clinical applications frequently and to bring to the student's attention some of the more important research work in a manner neither too elementary nor too advanced". The author, while not neglecting the basic fundamentals, has missed no opportunity to correlate clinical significance with theoretical knowledge. The plan of the book is orthodox and the scope of the material is wide but has been successfully handled. The text commences with a note on organic and inorganic biological constituents. A brief, but adequate, treatment of physical chemistry, the understanding of which is necessary for a satisfactory concept of biochemistry, is included. The detailed chemistry, absorption and metabolism of carbohydrates, fats and proteins are considered. The biochemistry of the various tissues and of blood is presented and a chapter on the clinical significance of changes in the composition of blood is included. Nutrition and energy metabolism are dealt with in detail with particular emphasis on clinical aspects. Vitamins and hormones are considered in detail from both the clinical and academic view-points. Biological oxidation is well presented. Mineral metabolism and water balance, the biochemistry of urine and acid-base balance are fully treated. A discussion of chemical structure in relation to biological phenomena covers the problems of detoxication and biochemical antagonism. The concluding chapter, a consideration of the recent clinical applications of biochemistry, is noteworthy—covering amongst other subjects, the biochemistry of inflammation, dental caries, the biochemistry of tumours, the mucolytic enzymes and pyrogens. For the advanced student the book is reasonably well provided with references to the key literature. The format is pleasing and the printing excellent. The book is of interest as a more or less up-to-date review of the subject and it is hoped that it will achieve the wide acceptance it merits.

[1] "Synopsis of Pediatrics", by John Zahorsky, A.B., M.D., F.A.C.P., assisted by T. S. Zahorsky, B.S., M.D.; Fifth Edition; 1948. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 7½" × 5", pp. 450, with many illustrations, some of them coloured. Price: 41s.

[2] "Bronchiogenic Carcinoma and Adenoma: With a Chapter on Mediastinal Tumors", by B. M. Fried, M.D.; 1948. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson. 9" × 6", pp. 324, with 118 illustrations. Price: 45s. 6d.

[1] "Human Biochemistry", by Israel S. Kleiner, Ph.D.; Second Edition; 1948. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9½" × 6½", pp. 656, with 77 illustrations, some of them coloured. Price: 52s. 6d.

The Medical Journal of Australia

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THE DISABLED WORKER IN INDUSTRY.

LIKE many other branches of medicine, industrial medicine has what may be called a double appeal to medical practitioners. The specialist in industrial medicine deals with men and women employed in industry; he supervises the conditions of their employment from the point of view of health and safety and also has a watching brief in regard to the suitability of a worker for his or her job; in addition, of course, he has to see that treatment is instituted in the event of accident or of illness contracted at the place of employment. The general practitioner, or family doctor, has to know something about the type of work that his patient does, for he has to deal with the patient as a whole. The type of work that a man does colours his whole life; therefore to treat as an isolated, unrelated incident an illness or disability for which a patient is seen at home or hospital, is to fail in understanding and also in duty. Not only must a family doctor be satisfied that his patient's work is suitable for him, but he must be certain that accident or illness does not interfere with his suitability. This means that he has to have the same attitude of mind as the industrial medicine specialist has in regard to the enormous subject of rehabilitation in industry. Ideas of this kind have been expressed in these columns on previous occasions when one of the many aspects of industrial medicine has been discussed. The subject is of such importance that no apology need be offered for yet another mention of it. In the issue of May 29, 1948, in an article on the placement of disabled persons a résumé of the different editorial discussions on rehabilitation was given together with names of documents dealt with in each. Reference to the list will show that since 1943 rehabilitation in industry has exercised the minds of authorities in many countries. It is not known as widely as it should be that workers who are physically impaired may give very good accounts of themselves at work suitably chosen. This has been shown on many occasions, but attention should be directed to the report of J. S. Felton,[1] who is medical director of the Oak Ridge National Laboratory, carrying on work for the Atomic Energy Project. Felton points out that in the United States both Federal and State funds are used for "the restoration of the handicapped to the fullest physical, mental, social, vocational, and economic usefulness of which they are capable". At one of the national atomic research laboratories it has been the policy to place each applicant for employment if his physical capacities, determined by extensive examination, could meet the requirement of the job. Under this policy the laboratory from which Felton writes has employed 452 persons whose physical capabilities made it necessary to include certain job restrictions as a condition of employment. The observations recorded deal with only 300 of these, because 152 either terminated employment or had been with the laboratory for too brief a time to allow proper appraisal of their job performance. The 452 persons formed a group obtained after the examination of 4064 applicants for employment and represent 11·1% of that total. They are described as physically qualified for special employment only with certain restrictions stating certain activities which should not be undertaken by them. It is important to note that only 1·2% of applicants failed to secure employment because of severe disqualifying defects. Of the 300 "impaired" workers, 75% were men; the group included representatives of all job groups; 90% were whites; the highest age group percentage was 41·3, that of workers 20 to 29 years of age. Ex-service personnel accounted for 28·3% of the group. The main disabilities encountered were, in order of frequency, hernia, ocular disorders, oto-rhino-laryngological disorders, orthopædic conditions, neuropsychiatric disorders and tuberculosis. A control group was chosen and comprised 300 employees who were regarded as physically perfect and who corresponded fairly well to the group under investigation in regard to age, race, sex, occupation *et cetera*. It is interesting to note that what was investigated was "job performance". The word efficiency is not used, though it will apply to an investigation of this type. Some capable workers have a curious dislike of being called efficient and the explanation would seem to be that to them efficiency denotes a more or less mechanical performance of accurate work. But this is not germane to the present discussion. The factors noted in the job performance or efficiency were ten in number: quality of work, quantity of work, job knowledge, and adaptability, judgement, dependability, attitude, attendance, punctuality, and ability. When job performance was judged as a whole, no significant difference was noted between the impaired and the unimpaired groups. The only significant difference noted in the scores for individual qualities was in quantity of work, and here the impaired workers had a higher score than those who were unimpaired. In our discussion on this subject in May, 1948, reference was made to the testing of persons engaged in industry, and included in the tests was one, a *questionnaire*, which consisted of "a neuro-psychiatric and psychosomatic inventory of symptoms which are evidence of maladjustment". Certain crucial questions were described as "stop questions", because any subject who showed hesitation in answering them ought to be "stopped for more intensive appraisal". This test is described by Felton as an appraisal of emotional adjustment and the scores obtained by it are referred to as the Cornell index scores. The impaired group gave higher scores than the unimpaired group and thus are said to have a greater neurotic tendency. The

[1] *Occupational Medicine*, May, 1948.

aim of placement in industry has been described as "the employment of the disabled person in a job which he has the ability to do as efficiently as his able-bodied fellows without being a hazard to himself or jeopardizing the safety of the others, and without the possibility of aggravating his own disability". In the work reported by Felton it is clear that placement was well carried out. The fact that the impaired group did better than those who were unimpaired need cause no surprise. To begin with they were selected as being fit to do the work to which they were assigned, but they knew that they were not in the so-called perfect physical group. They would almost certainly, though they might not have realized it, have had a psychological urge to excel at their tasks. They would not have so many or such powerful distractions as those who were perfectly fit and they would probably wish to hold their jobs, because suitable jobs do not always fall to the lot of the unfit. Most men know that they are really happy only when they have suitable and congenial work to do.

The investigation reported by Felton is not the only one of its kind that has been undertaken. Included in the report is a long table setting out the details of previous studies. Taken as a whole these studies show that the handicapped worker, if not superior to the able-bodied man in industry, is at least as good in the majority of instances. Felton does well to point out that the worker's job assignment has rested in some instances with the personnel director, sometimes with the industrial health service and sometimes again with the foreman. This may be what Felton calls an "unstable situation in the employment of the disabled", but the fact remains that the handicapped person can be a satisfactory working member of the community. Of the two groups of medical practitioners mentioned at the outset of this discussion, the specialist in industrial medicine no doubt knows all about this; the practising member of the profession, the family doctor, may not realize it, and if he knows it, he may forget. Investigations such as Felton has reported are most useful in that they make both the industrial medical specialist and the family doctor think of these things. The point to be emphasized in all dealings with workers who are not really fit, is not what they are unable to do or must not attempt, but the great field of activity in which they can excel. Felton's story would be a good object lesson to any practitioner in need of one when he is dealing with a patient who does not understand.

Current Comment.

TETRAETHYLAMMONIUM CHLORIDE: SOME WARNINGS.

TETRAETHYLAMMONIUM chloride (or bromide), after a stage of preliminary trial, is now used fairly widely. It acts by blockage of the transmission of nerve impulses through autonomic ganglia, producing among other effects loss of vasomotor tone. Conditions for which it has been particularly recommended include hypertension, causalgia and peripheral vascular disease, and its use for a variety of other conditions has been reported. The effects obtained have not been uniformly constant and opinions are still divided as to its efficacy or at any rate as to its field of application; it is generally acknowledged that it is a powerful drug which with further experience of its use should find a real, if limited, place in the therapeutic armamentarium. However, it is well to note at this stage some of the warnings regarding its use. Toxic effects have not been frequent, perhaps because most investigators have approached its use with caution, but all who use the drug should know what has happened. The most notable adverse effect reported by earlier investigators was severe depression of the blood pressure with associated vascular collapse and signs of cerebral anoxia; R. H. Lyons *et alii*[1] described such effects in a group of hypertensive patients in 1947 and a similar reaction has been reported in a patient with normal blood pressure. Others have reported curariform effects, which necessitated artificial respiration, and myocardial infarction. Two deaths have been recorded. The first of these, according to R. P. Lasser, N. Rosenthal and L. Loewe,[2] was that of a woman, aged thirty-three years, with malignant hypertension. The patient had undergone sympathectomy with relief of headaches but only transient reduction in the systolic blood pressure. As her condition was rapidly deteriorating and no other treatment could be suggested, five millilitres (500 milligrammes) of tetraethylammonium chloride ("Etamon") were given intravenously over a five-minute interval. The systolic and diastolic blood pressures fell to far below normal levels with accompanying coma and shock. Despite a transient rise in blood pressure to normal levels, the patient died six hours after receiving the drug. "Coramine" and adrenaline were apparently the only drugs given during attempted resuscitation. No mention is made of neostigmine, which has been stated by several investigators to produce prompt interruption of the effects of tetraethylammonium chloride; it is specially mentioned in a report to the Council on Pharmacy and Chemistry of the American Medical Association, made by K. S. Grimson *et alii* and appearing in the same journal as the report of Lasser and his colleagues. The importance of having neostigmine at hand during the use of tetraethylammonium chloride has been since stressed by J. P. Hendrix,[3] who also points out the disadvantages in the use of adrenaline, which produces tachycardia, and to the effects of which the patient is sensitized by the action of tetraethylammonium chloride. One point of particular interest in the report by Lasser, Rosenthal and Loewe is the evidence of a considerable degree of renal impairment, and it is suggested that this may have prolonged the action of the drug.

The effect of tetraethylammonium bromide on the kidneys in relation to renal cortical ischæmia has been examined by several investigators. In a preliminary report last year F. E. Stock[4] stated that the injection of tetraethylammonium bromide into rabbits had prevented the renal cortical ischæmia which would otherwise have followed crushing of a limb. Incomplete clinical investigations suggested that a beneficial effect might occur from tetraethylammonium bromide used for conditions in which renal cortical ischæmia is possibly the underlying pathogenic factor, for example, pre-eclampsia, essential hypertension, traumatic anuria and reflex anuria. Stock's work was actually confined to a group of patients with pre-eclampsia. A rather different light is thrown on the question by a recent report from Norway. Knut Aas and Einar Blegan,[5] of Oslo, investigated the effect of the drug on the kidneys of normal subjects and found that the intravenous injection of the drug into normal adults reduced the renal blood flow and glomerular filtration rate, apparently as a result of renal vasoconstriction. An acute and significant decrease of water diuresis also occurred, often with proteinuria. These results, as Aas and Blegan point out, suggest the need for restraint in the use of tetraethylammonium bromide in conditions in which there is reason to believe that renal vascular spasm plays a part.

A final warning is in the second report of death from tetraethylammonium bromide. Michael Schwartz,[6] of

[1] *The American Journal of the Medical Sciences*, March, 1947.
[2] *The Journal of the American Medical Association*, January 15, 1949.
[3] *The Journal of the American Medical Association*, March 12, 1949.
[4] *The Lancet*, October 9, 1948.
[5] *The Lancet*, June 11, 1949.
[6] *The Lancet*, June 11, 1949.

Copenhagen, states that in 1947 he used the drug in the treatment of seven patients with bronchial asthma; 300 to 400 milligrammes were injected intravenously. In the first six cases the effect on the asthma was but slight; in two cases the attacks were checked and in the other four the asthma was slightly aggravated. In none of these six cases were any alarming side effects observed. The seventh patient died immediately after the injection of 230 milligrammes of the drug; no other factor likely to cause death was found *post mortem*. Schwartz suggests that the rate at which the injection was given may have been a decisive factor, but it seems that patients with asthma are particularly sensitive to the action of the drug; the work of other Scandinavian investigators is quoted in support of this. In view of this risk and the fact that the drug does not seem to be particularly effective against asthma, Schwartz advises against its use in the treatment of asthma. With this we must agree and suggest that tetraethylammonium bromide (or chloride) is a drug to be treated with respect, despite its extensive use with apparent impunity.

COUGH IN CARDIO-VASCULAR DISEASE.

COUGH is so common a punctuation of conversation and other acts of the daily commerce of life that even at the bedside it may be overlooked. That this is sometimes true even in the daily life of the doctor is shown in an article by James H. Currens and Paul D. White.[1] They remark that such symptoms as shortness of breath or pain are in some sense abnormal, whereas cough, though not always exciting attention, may sometimes be significant in cardio-vascular disease. This article describes the clinical history of a number of patients illustrating a variety of diseases of the cardio-vascular system in which cough was an early and important symptom. The conditions studied include rheumatic heart disease with mitral stenosis, thyreotoxicosis, hypertensive coronary disease, cardio-vascular syphilis, aortic aneurysm, calcification of the pericardium and congenital heart disease. Mitral stenosis, of course, now and then misleads the incautious observer, especially when, as in the case quoted by Currens and White, non-productive cough followed by hæmoptysis at first suggests a pulmonary cause. Their patient even after the diagnosis was established had a recurrence of hæmoptysis after an infection of the upper respiratory tract. Two patients with thyreotoxicosis are described; in one the finding of a diastolic murmur was misleading, and still more so was the existence of a troublesome cough which lasted for months. This symptom was thought at first to be due to bronchitis, though its progressive nature and its occurrence chiefly at night were suggestive of the cardiac failure which was later evident. Similarly, the occurrence of nightly spasms of coughing in an elderly subject of hypertension should have pointed to the probability of nocturnal dyspnœa due to left ventricular failure, but perhaps the appearance of a little blood in the sputum was misleading instead of being informative. In another instance an elderly woman who had been under treatment for hypertension and slight angina of effort had a cough so dry and persistent that she was unable to sleep for weeks, until at last the true cause was recognized. Syphilis was the cause in a couple of cases cited, in which persistent cough was the outstanding presenting sign, due not only to the general effect on the cardiac and pulmonary circulations, but also to the mechanical effect of an aneurysm. In one of these patients, who eventually died of tracheal obstruction, autopsy showed that the trachea was so firmly attached to an aneurysm of the aorta that the two structures could not be dissected apart without one of them being torn. One interesting feature here was that, in spite of this irrevocable pathological condition, difficulty in breathing was periodic only up to a few days before death. This common clinical phenomenon of mutable or periodic symptoms due to a fixed cause is of great importance; more could be written about it with advantage. It is evident that it is related to changes in the other variables, so numerous and complex in our bodies, but it is useful to remember that a variable symptom does not exclude an immutable lesion. Pericardial disease is another cause of cough. In one of the quoted cases there were unusual features, for the patient was discovered in a routine examination for military service, and calcification of the pericardium was diagnosed. Though he had no striking circulatory symptoms at this time, some of the pericardial constriction was removed at operation, but signs of cardiac failure appeared later, and two further operations were needed before reasonable health was restored. In retrospect it was noted that cough was an early and significant symptom of heart failure in this man and was a pointer also to the necessity for special study being given to the condition of the pericardium over the left ventricle. A baby with congenital cardiac disease showed some unusual features, as he had audible respiration and a loose cough on occasion. After some years of successive attacks of bronchitis with intermitten stridor his condition was fully investigated and he was found to have a persistent right aortic arch, with a vascular ring constricting the trachea and œsophagus. The trouble was completely removed by operation. This interesting collection is made complete by a description of a woman who had cough and known syphilitic aortic disease. Observation showed that her cardio-vascular disease was stationary and without any disturbance of circulatory function, the cough being purely nervous in origin.

In conclusion the authors comment that cough as an important symptom of cardio-vascular disease has been greatly neglected. Though some of their examples appear simple, and of the type that are emphasized in ward teaching of students, they still give rise to error. The cough may be chronic, spasmodic or paroxysmal, and careful observation of its periodicity, nature and accompanying phenomena may give the clue to its true cause. The short bibliography given by the authors supports their statement that not sufficient attention has been drawn to this symptom. It is so clearly related to disturbed physiology of the thoracic organs that it is surprising that it is possible to forget that the heart and great vessels are contained in the chest as well as the lungs.

[1] *Annals of Internal Medicine*, March, 1949.

CHLOROQUINE AND HEPATIC AMŒBIASIS.

THE antiplasmodial activity of chloroquine is well established and the drug has been used extensively in the suppression of malaria. It was known that chloroquine was highly concentrated in the liver, found to a much lesser degree in the intestinal walls and excreted in the fæces only in small amount. Because of these properties, N. J. Conan, junior,[1] in setting out to determine whether the drug had antiamœbic activity, decided that amœbic infection of the liver rather than of the colon would be the test object of choice. His results are striking. He presents a detailed account of eight patients with hepatic amœbiasis who were all successfully treated with chloroquine, seven by himself and one by F. Murgatroyd, of London. He quotes also the results of other investigators, communicated personally to him, which bring the total number of patients with hepatic amœbiasis cured by means of chloroquine up to 22. The evidence indicates that it is at least as effective as emetine and lacks the toxicity which is such a disadvantage of the latter drug. On the basis that it is theoretically highly desirable to treat every patient with intestinal amœbiasis with agents designed to eradicate amœbæ wherever they may be in the body, a practice not feasible when emetine was the only available agent for treating extra-intestinal amœbiasis, Conan recommends that chloroquine be employed in addition to a more efficient intestinal amœbicide for the treatment of all patients with intestinal amœbiasis. Conversely, for the treatment of hepatic amœbiasis, an intestinal amœbicide should always be employed in addition to chloroquine. Conan's results appear to confirm his confidence in such a combination not only for treatment, but also for purposes of diagnostic and therapeutic tests.

[1] *The American Journal of Medicine*, March, 1949.

Abstracts from Medical Literature.

PHYSIOLOGY.

Motion Sickness in Dogs.

R. L. NOBLE (*The American Journal of Physiology*, September, 1948) reports that the dog may readily become adapted to motion sickness. Over a period of years during which a colony of susceptible animals was used for repeated tests there was a gradual change so that the susceptibility diminished. This was shown in many cases by an increase in the degree of swinging necessary to make the dog vomit. Animals which showed the lowest susceptibility at the start become immune to motion much more rapidly than those of highest susceptibility. Of this latter group the response of some animals remained practically unchanged when swung every five days for as long as three years. The gradual alteration in susceptibility which takes place in dogs is of particular importance when one is conducting therapeutic experiments. Besides an alteration in the control test, animals as they become less susceptible to motion are effectively treated by progressively smaller doses of drugs. The authors give details of experiments to show adaptation in accompanying tables. In ten cases presented in detail all dogs became relatively resistant to swinging after repeated exposures. In one case with intervals of one week between tests the animal became refractory. In general, the shorter the interval between tests, the more rapidly did adaptation take place. Even with rest intervals up to ten weeks between tests, however, the animals all showed a progressive loss of sensitivity. Some tests were designed to see if prolonged swinging on each occasion would enhance the onset of refractiveness. In one case this seemed to be so, but the changing susceptibility of the dogs to repeated tests made the observations unreliable. In the human being adaptation to any one form of motion appears to be highly specific, in that individuals became ill when exposed to other forms of motion. One dog which was normally susceptible to vertical motion remained so, although it was made refractory to the ordinary swing. On the other hand, when it was made immune to vertical motion it was found to be also immune to swinging. Apparently these two types of motion were sufficiently similar for adaptation to be effective to some extent in both. Various drugs were administered to see if they would affect the development of resistance in any way. Two substances, "Prostigmin" and a thiobarbiturate, which might be expected to render the dogs more susceptible to motion sickness, had no effect on adaptation to motion. Hyoscine, which is effective in treating motion sickness in human beings, but not in dogs, did not enhance or prevent the onset of adaptation. The barbiturate V-12 was used to prevent motion sickness in a susceptible dog, and this animal was able to become adapted to repeated swings even though it was not ill. Also, the refractory state was maintained by swinging when the animal was still protected by treatment. This experiment would suggest that effective therapy of motion sickness is compatible with the development of adaptation to motion. Throughout the experiments on repeated exposure to motion no animal showed any evidence of becoming conditioned to vomiting. One such animal is reported from a different laboratory. The salivation and vomiting which normally took place when this dog was simply placed on the swing was prevented with V-12 as was any effect of actual swinging.

Mechanism of the Arterial Response to the Valsalva Test.

S. J. SARNOFF, E. HARDENBERGH AND J. L. WHITTENBERGER (*The American Journal of Physiology*, August, 1948) report an examination of the arterial response to the Valsalva test on the basis of its possible use as an indicator of the intactness of the sympathetic outflow. They state that pressure changes in various parts of the circulatory system, resulting from a thirty-second elevation of intrapulmonary pressure, form characteristic and consistent patterns. The arterial pressure response has six components, with one of which, the post-stimulus "overshoot", or rise of blood pressure above the pre-stimulus level, the authors are mainly concerned in this paper. They state that this overshoot is the result of reflex sympathetic activity engendered by the hypotension present in the carotid sinuses during the period that venous return is impaired. The extent of participation by the aortic receptors was undetermined. Removal or diminution of carotid sinus activity diminishes or abolishes the overshoot. Partial or complete blockade of reflex sympathetic activity, either by tetraethylammonium chloride or by graded, segmental, spinal anæsthesia, diminishes the overshoot in direct proportion to the extent of the blockade. Vagal activity inhibits the overshoot to a variable degree. The presence of an excess of circulating adrenaline diminishes and may abolish the overshoot. The overshoot of right ventricular systolic pressure is influenced by the presence or absence of carotid sinus activity, much as is the overshoot of systemic arterial pressure. The standardization of any clinical test designed to use the degree of overshoot as a quantitative estimate of sympathetic activity should take into consideration the factors of medication, vagal activity, cold, apprehension, carotid sinus sensitivity and the presence of circulating adrenaline, as well as the patient's blood volume.

Electrophrenic Respiration.

S. J. SARNOFF, E. HARDENBERGH AND J. L. WHITTENBERGER (*The American Journal of Physiology*, October, 1949) state that it is feasible to produce artificial respiration by the electrical stimulation of one or both phrenic nerves. By this means the animal's spontaneous minute volume can easily be exceeded and the tensions of oxygen and carbon dioxide in arterial blood maintained at satisfactory levels for as long as twenty-two hours in the absence of spontaneous respiratory activity. The rate and depth of respiration and the contour of respiratory air flow can be readily modified within broad limits. Clinical and experimental implications of the method are presented. The prolonged experiments indicate that the neuro-muscular mechanism is capable of sustaining prolonged electrical stimulation, and the method is thus capable of maintaining life for prolonged periods of time. It is the authors' opinion that in these experiments the failure at the end of the prolonged periods was not due to failure of the neuro-muscular mechanism. Under conditions not necessitating deep barbiturate narcosis or central nervous system interference, it is anticipated that stimulation could be successfully maintained for considerably longer periods. The authors quote the work of Fender, who implanted silver electrodes on both splanchnic nerves of the dog and effectively stimulated them with from six to eight volts for eight hours a day on six days a week for five and a half months. At the end of that time the nerves responded well to stimulation and showed no anatomical evidence of injury. They state that, experimentally, the method may prove useful in several ways: the production of regular breathing in hæmodynamic studies, when irregular breathing often beclouds the interpretation of vascular data; the elucidation of neurogenic control of breathing; the separation of ventilation into diaphragmatic and intercostal components; the separation of respiratory weakness into central and neuro-muscular components; and the ease of obtaining reproducible ventilation patterns in studies of lung absorption of inhaled gases, aerosols *et cetera*. The potential advantages of this method include portability and low cost of the apparatus, ease of nursing care, freedom of movement of the patient and the therapeutic effect of keeping a partially paralysed diaphragm active. Candidates for this method would be those with intact phrenic nerves, for example, patients with bulbar depression or paralysis or high spinal anæsthesia. Possible use of the method in patients with anterior horn cell disease must await further study.

Blood Pressures of Rats Subjected to Auditory Stimulation.

E. H. YEAKEL, H. A. SHENKIN, A. B. ROTHBALLER AND S. M. MCCANN (*The American Journal of Physiology*, October, 1948) state that after a year's exposure to the sound of a blast of compressed air, five minutes a day for five days a week, the average systolic blood pressure of 25 grey Norway rats rose from an initial value of 113 millimetres of mercury to 154 millimetres in the last two months. The change is statistically highly significant. A control group of 17 animals, most of them litter-mates of the experimental rats, showed an increase from 124 to 127 millimetres of mercury in the same period. Sixteen of the air-blasted animals and two of the controls had average blood pressures of 150 millimetres of mercury or more at the close of the experiment. Monthly averages indicated that the rise in systolic blood pressure of the experimental rats tended to occur in the ninth month after air blasting was begun. In the majority the increase occurred rather abruptly. The average of all systolic pressure readings in each rat before and after the rise showed an average change of 29 millimetres of increase. The difference is statistically highly significant. No such change was observed in the control group. A significant increase in diastolic pressure (recorded under ether anæsthesia with a Hamilton manometer) was found in a number of the experimental rats. There was no correlation of direct systolic blood pressure readings taken under ether anæsthesia

and indirect readings taken on the same but unanæsthetized rats. There was a good correlation of indirect and direct systolic measurements when taken under as nearly identical circumstances as possible. The results of the experiment suggest that an auditory stimulus applied over a prolonged period of time may produce an increase in the systolic and diastolic pressure of the rat.

BIOCHEMISTRY.

Oxidation of Glucose.

D. B. ZILVERSMIT *et alii* (*The Journal of Biological Chemistry*, October, 1948) have measured the rate of conversion of administered radioglucose to carbon dioxide in normal and alloxan-diabetic rats. $C^{14}O_2$ appeared within the first thirty minutes in the expired air of both normal and alloxan-diabetic rats. The amount of plasma glucose converted to carbon dioxide was measured by two methods. The first was based on the specific activities of plasma glucose and the amounts of $C^{14}O_2$ in the expired air, the second on the amounts of $C^{14}O_2$ exhaled by the nephrectomized rats. As judged by these procedures, the rate of conversion of plasma glucose to carbon dioxide by the alloxan-diabetic rat does not differ significantly from that normally found.

Nephrosis.

A. A. ALBANESE *et alii* (*The Journal of Laboratory and Clinical Medicine*, March, 1949) have carried out amino-acid analyses of the proteins found in the urine and abdominal cavity of patients suffering from nephrosis. These analyses reveal that the urinary albumin and globulin have a different amino-acid pattern from the plasma albumin and globulin. This finding suggests that the hypoproteinæmia of the disease is due to the utilization of amino acids for the formation of the aberrant proteins occurring in the excretory fluids rather than the excretion of normal blood proteins. The further suggestion is made that protein preparations which simulate the amino-acid patterns of the urinary proteins should be assayed in the dietotherapy of the disease.

Induced Diabetes.

J. W. CONN *et alii* (*The Journal of Laboratory and Clinical Medicine*, February, 1949) report that a state of metabolism similar in all respects to clinical *diabetes mellitus* has been produced in normal human beings by administration of a purified preparation of adrenocorticotropic hormone (ACTH). They state that it seems evident from the results that permanent *diabetes mellitus* in man could be produced with this material were caution not exercised with respect to duration of administration and dosage employed. The diabetes evidenced during such treatment was found to be relatively resistant to exogenous insulin. This fact does not indicate necessarily that resistance to endogenous insulin is the mechanism by which loss of carbohydrate tolerance is effected by ACTH. Analysis of the metabolic data discloses a consistent correlation between loss of tolerance for carbohydrate, increased endogenous purine metabolism, and depressed levels of blood glutathione. It is suggested that ACTH may effect changes in the composition of intracellular fluid, which include increased concentrations of intermediaries of purine metabolism and decreased concentrations of sulphydryl-bearing compounds. It is suggested further that, since the β cells of the islets of Langerhans are known to be more sensitive to injury by the aforementioned intracellular alterations (probably by virtue of their insulin-producing function) than are any other cells of the body, a functional impairment of these cells occurs which increases their vulnerability to hyperglycæmia. Negative nitrogen balance is not a necessary accompaniment of glycosuria produced by ACTH. Although greater loss of carbohydrate tolerance is observed in subjects who lose body protein, the two metabolic phenomena are not mutually dependent. Specific steroids of the 11 or 11-17 oxygenated types may be responsible for each phenomenon. Some of the data suggest that there may exist more than one pituitary adrenocorticotropic hormone.

Effect of Adrenalectomy on Arginase Level.

S. J. FOLLEY AND A. L. GREENBAUM (*The Biochemical Journal*, Volume XLIII, Number 4, 1948) have shown that the liver, kidney and mammary gland arginase levels of rats subjected to adrenalectomy on the fourth day of lactation and examined *post mortem* on the seventeenth day are significantly lower than those of pair-fed sham-operated lactating rats. The amount of arginase per gramme of moist tissue was reduced most in the mammary gland (to one-seventh) and least in the kidney (to one-half). The tissue arginase levels of sham-operated lactating rats pair-fed with rats which had undergone adrenalectomy were not significantly lower than those of sham-operated rats fed *ad libitum*, save in the case of the total amount of arginase in the liver and in the "abdominal" mammary glands, the reduction in which was in each case due to a decrease in the size of the gland or glands concerned. It is concluded that the results indicate a closer relationship between adrenal-cortical hormones and the arginase of the mammary gland and kidney than would be the case if the decrease in the enzyme concentration was due primarily to post-operative anorexia. Reasons are advanced for the belief that the diminution of liver arginase content following adrenalectomy is not primarily due to anorexia. A reevaluation of the relative arginase activity of the mammary gland, in relation to that of other tissues in the intact rat, indicates that liver contains nine times the amount in mammary tissue and twenty-eight times the amount in kidney. These ratios are much the same in intact lactating rats on a reduced food intake, but in rats which have undergone adrenalectomy the activity of the mammary gland relative to the liver falls slightly below that of kidney.

Insulin Inactivation.

I. A. MIRSKY AND R. H. BROH-KAHN (*Archives of Biochemistry*, January, 1949) have found a system in extracts of various tissues of different animal species which appears to be an enzyme capable of destroying the physiological activity of insulin during in-vitro incubation. This system is tentatively designated as insulinase. The distribution of insulinase in various tissues and species and its properties have been noted. Evidence has been adduced to indicate that insulinase does not resemble ordinary proteolytic enzymes. It is suggested that the activity of insulinase may depend upon the participation of a sulphydryl group. The apparent role of magnesium and manganese salts, and of zinc, copper and other metals, as activators or inhibitors of insulinase, has been described.

R. H. BROH-KAHN AND I. A. MIRSKY (*ibidem*) have shown that fasting produces a marked reduction in the insulin-inactivating system (insulinase) of rat livers. The insulinase activity of liver of rats which have fasted is restored to normal by the feeding of a balanced diet. It is postulated that there may be some relationship between the insulin content of the pancreas and the insulinase activity of the liver.

Interaction of Calcium, Phosphorus, and Vitamin D.

B. B. MIGICOVSKY AND A. R. G. EMSLIE (*Archives of Biochemistry*, February, 1949) report that experiments on the excretion of calcium and phosphorus by starving chicks indicate that vitamin *D* decreases the loss of calcium via the excreta and has little effect on the phosphorus. Calcium ingestion decreases the loss of phosphate. When chicks were used which had been previously fed radioactive calcium, vitamin *D* decreased the specific activity of the excreta calcium; this indicated a retention of calcium in a tissue of high specific activity, namely, newly formed bone.

MEDICINE.

Transient Cerebral Paralysis.

G. W. PICKERING (*The Journal of the American Medical Association*, May 29, 1948) discusses transient cerebral paralysis in hypertension and in cerebral embolism, with special reference to the pathogenesis of chronic hypertensive encephalopathy. Hypertensive encephalopathy comprises at least two distinct clinical and pathological conditions. In acute hypertension, or chronic hypertension with recent exacerbation, attacks of headache, vomiting, convulsions and coma are generally due to acute œdema of the brain. This œdema is less likely to be caused by excessive constriction of the cerebral arteries, as is now commonly held, than by defective constriction, as Traube originally supposed. In chronic hypertension attacks of localized sensory or motor paralysis of brief duration are probably not due to cerebral arterial spasm, but to sudden organic arterial occlusion, for example, by a thrombus. The speed and extent of recovery from paralysis will depend on the size of the final infarct and on its position. The arguments put forward in favour of this hypothesis are: firstly, that the cerebral arteries have comparatively poorly developed muscular walls; secondly, that they contract feebly in response to known vasoconstrictor agents; thirdly, that in 11 patients with chronic hypertensive encephalopathy no sharp dividing line was found between attacks in which paralysis lasted only a few minutes and attacks from which complete recovery did not occur; fourthly, that in 11 patients embolic occlusion of cerebral arteries produced attacks that were precisely similar in kind and range to those occurring in hypertension.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held on March 31, 1949, in the Verco Theatre of the Institute of Medical and Veterinary Science, Adelaide, the President, DR. A. D. LAMPHEE, in the chair.

The Prostate: Some Commonly Disregarded Principles and Precepts.

DR. W. J. CLOSE read a paper entitled "The Prostate: Some Commonly Disregarded Principles and Precepts" (see page 41).

DR. NOEL BONNIN, in opening the discussion, said that he was particularly interested in the figures of the incidence of carcinoma of the prostate in South Australia and in the Royal Adelaide Hospital. He asked Dr. Close if he had noted any increase in the expectation of life of local patients after the introduction of œstrogen therapy. Dr. Bonnin said that Dr. Close's view that early diagnosis and radical surgery provided the best hope of cure in carcinoma of the prostate was in conformity with the opinions of many urologists in the United States and especially the Baltimore school. It must be recognized, however, that there were many difficulties in the way and the assessing of results was by no means easy. There were no early symptoms of the disease and some 90% of patients had an inoperable condition when first examined. In those patients who did present themselves early it was most difficult to confirm the diagnosis. There were, it seemed, no clear-cut pathological criteria of malignancy. Estimates of the incidence of the disease varied from about 11% to some 30%, and that when the whole gland was available for section and not just a small biopsy specimen. In the clinics which Dr. Bonnin had visited in the United States in 1948 needle biopsy had been given up as a means of early diagnosis, and in a recent article Barnes had shown that random biopsy taken with the resectoscope gave actually a lower percentage of correct diagnoses than that obtained by digital palpation *per rectum*. It would seem that the only feasible method whereby patients could be given early radical surgery was by the perineal exposure of all suspicious glands and a biopsy of any suspicious area. A simple or radical operation could then be performed according to the result of the frozen section. The adoption of that course would mean that one would have to perform the perineal operation on a fair proportion of non-malignant prostates. That procedure had been given a fair trial at Baltimore during the last forty years. Of patients admitted to hospital with carcinoma of the prostate, 10% were found to have an operable lesion, and of those 39% survived five years or more. The 50% figure quoted by Dr. Close referred to those cases in which the disease was confined within the capsule of the gland. In fact then only about 4% of the total number of patients admitted with the disease could be given a five-year survival by the methods mentioned. In the assessment of the results of treatment of carcinoma of the prostate the occurrence of the dormant type of carcinoma already referred to by Dr. Close had to be kept in mind. In those cases the survival time was prolonged in the absence of any treatment, so that survival times after treatment had no significance. Also, a fact affecting figures in the opposite direction, the naturally short expectation of life in that group of patients tended to vitiate statistics based on survival times. Personally Dr. Bonnin felt that at the moment the best method of handling the vast majority of patients with carcinoma of the prostate was by œstrogen therapy, with resection when necessary to relieve obstruction. After all, a small but appreciable percentage of patients treated in that manner would survive five years or more. However, it seemed that in early cases the patient could be given a chance of survival by radical surgery, and Dr. Bonnin congratulated Dr. Close on having two patients of his small series alive and well after five years. In regard to simple adenoma of the prostate, Dr. Bonnin was most interested by Dr. Close's description of his ingenious operation. Dr. Bonnin thought that Dr. Close was perhaps unfortunate in having described the procedure at about the same time as Harris described his operation. Both procedures controlled hæmorrhage by approximation of the bleeding surfaces in the prostatic bed and constituted a great advance on the old Freyer method, in which no positive method of checking hæmorrhage was employed. However, Dr. Bonnin felt that the old surgical principle that bleeding should be controlled where possible by direct attack on the bleeding point should apply to the prostate as much as it did elsewhere and approaches such as Millin's which allowed of that were to be preferred.

DR. R. A. ISENSTEIN discussed infections of the prostate, the majority of which, he said, were, of course, secondary to specific or non-specific urethritis, but it must be realized that a large number of cases of prostatitis did result from various other causes. He agreed with Dr. Close that, without the aid of the wet film and a microscope, it was, in most cases, impossible to diagnose the presence of chronic prostato-vesiculitis, and that to assess the value of treatment, repeated examination of the prostatic secretion must be made by the urologist in the consulting room with the aid of the microscope. Having made many thousands of prostatic examinations over the past eight or nine years, he had come to realize that individual prostates varied so much in position, size and texture, that he would hesitate to diagnose the presence or absence of prostatitis from palpation alone. The acute parenchymatous or the superficial follicular abscess might present no difficulties, but the patient's individual reaction to examination was no criterion of the amount of damage present, as that varied considerably. Separate small areas of induration or tenderness were sometimes felt, but without the microscope, Dr. Isenstein would hesitate to label them as evidence of prostatitis. Chronic prostatitis could, of course, exist for many years without causing symptoms, but as a symptom-causing disease, it was much more common than was generally recognized. Foci of infection were often looked for as a cause of arthritic or other diseases in various parts of the body, but rarely were the prostatic secretions examined. Impotence, loss of sexual desire and premature ejaculation were frequently treated by the psychiatrist when the venereologist would do the patient much more good. Dr. Isenstein said that he used the word venereologist as few surgeons regarded regular prostatic massage and examination of prostatic secretions as being within their province. One of the most common symptoms he had met with, particularly in middle-aged men, was backache or lumbar fibrositis. It was becoming increasingly common in servicemen with insufficiently treated prostatitis, but was also common in older men with no past history of venereal infection. The incidence of prostatitis following venereal disease was rather high. In a series of records kept at a special hospital during the war, they had found that the incidence of prostatitis varied directly with the period of incubation of the urethritis; among those whose discharge did not manifest itself until fourteen to twenty-one days after contact, which number would include the majority of patients with non-specific urethritis, a large proportion already showed evidence of prostatic infection, even without the symptoms of acute posterior urethritis, before treatment was commenced. It was also interesting to note that in the series mentioned, comprising two separate batches of 100 patients, all of whom were treated with one of the sulphonamide drugs, and in whom the acute urethral discharge cleared up within a few days, about 50% had a residual prostatitis no matter how early treatment was commenced. That meant that there were still large numbers of sulphonamide-treated subjects of gonorrhœa or non-specific urethritis who might in the future need treatment for their residual prostatitis. In conclusion, Dr. Isenstein referred to the technique of prostatic massage. He said that if it was correctly performed one should rarely fail to obtain a drop of fluid from the meatus. Usually the amount was considerable—one or two millilitres. Pressure and stroking should be made with the pulp of the forefinger, use being made only of the finger muscles and not of the elbow joint. If incorrectly performed it was a useless and most uncomfortable procedure, but with the correct technique, the patient, after the first visit, learned to cooperate and experienced very little discomfort from subsequent treatments.

DR. I. B. JOSE said that he was particularly interested in the remarks made on prostatitis and carcinoma. He had not heard any mention of the treatment of prostatitis, which he had found very difficult and prolonged. He would like to know if there was any short cut in the treatment of chronic vesiculitis that had appeared effective. In regard to carcinoma it was a difficult problem not only to find the operable growth, but to decide then whether it should be treated conservatively or radically. His experience was that the apparently limited carcinoma that was found in the enucleated adenoma by the pathologist might sometimes, if ignored, spread rapidly and metastasize, whereas the obvious carcinoma might progress slowly for many years. If one knew what the carcinoma was going to do, one would know what to do to anticipate it. Then again, pathologists were often in marked disagreement about the microscopic diagnosis. In regard to biopsy, it seemed that the current tendency was to expose the prostate perineally and remove a portion of the posterior

lobe; it appeared to be the only way of ensuring a representative portion of tissue.

Dr. Close, in reply to Dr. Isenstein, said that he had purposely refrained from saying much about the male adnexæ as a site of focal infection. He had made a lot of that in a previous paper on seminal vesiculitis, already cited, and agreed with Dr. Isenstein that in the search for such foci the prostate and vesicles were very often ignored. He had touched on the possibility of such an origin when mentioning the Reiter syndrome. To Dr. Bonnin's query about the survival time of patients treated at the Royal Adelaide Hospital by endocrine therapy, Dr. Close replied that he had found it impossible to gain more than an unfavourable impression, since attempts to obtain information by correspondence had proved ineffective; it had been assumed that most of the patients had died elsewhere when hospital treatment had ceased to relieve them. He had relied on the information of others, such as Beatty (whose paper he had cited), who gave 2·7 years as the average survival period for those who had died, and 2·0 years only to date for those still surviving. Dr. Close did not think that many of the occult types were included in the 50% cures claimed by Young and Colston; he believed that those cases were excluded from the criteria for operation by Colston at least. With regard to perineal biopsy, he thought that Dr. Bonnin must have contacted abroad only those men who were not in favour, whereas he felt certain from recent reading that many Americans still reposed confidence in it. Certainly the method of aspirating with an 18-gauge needle gave very meagre information, but there were instruments that produced a core of tissue from a representative part of the posterior lobe. One of those was made for the speaker by Mr. Zeiss, which enabled him to obtain a core from either or both sides of the posterior lobe, about three-quarters to an inch long, if the gland substance was rigid enough, which it usually was. In a recent case, the only evidence the speaker was able to obtain in confirmation of his clinical diagnosis was a biopsy specimen. The pathologist's report was unequivocal, "highly malignant anaplastic carcinoma", and it was hoped to perform a retropubic radical operation on the patient in the near future. Dr. Close maintained that his operation did produce immediate hæmostasis; if a spurter was seen it would be clipped and included in the later suture, but he very seldom saw a spurter and did not believe in wasting time picking up imaginary ones. He also regretted having published his original technique at a time so near to Harris's publication; it looked like stealing the latter's thunder, but he was imbued with enthusiasm for Harris's work and really meant it as a tribute after searching over the other side of the world for a method that could satisfy him. Replying to Dr. Jose, Dr. Close said that the only short cut he knew of in the treatment of vesiculitis was the Belfield vasostomy. In the paper on seminal vesiculitis, which he had cited, he had referred to over 70 cases in which that operation was used in the services, and he believed that it had enabled men in military hospital to return to duty much earlier. Many more operations were performed by him, but he had found it seldom necessary in the civil and private clinics; it was a consulting room procedure under local anæsthesia. The main difficulty in treating prostato-vesiculitis was knowing when one had done enough, and the progress of a case could be determined only by watching the wet film. Referring to biopsy by perineal exposure, he said that he felt that, having done half the operation, he would like to go ahead and remove the prostate. Other methods had been suggested, such as a recent one by an Argentinian, who claimed that biopsy via the rectum was the safest and best. He was, however, not persuaded.

Correspondence.

THE PHARMACEUTICAL BENEFITS ACT.

SIR: In his letter published in THE MEDICAL JOURNAL OF AUSTRALIA of June 4, J. H. Priestley points out that Senator McKenna stated that the Federal Council had actually instructed members not to cooperate, and that the Senator knows that this statement is untrue. He suggests, after taking nearly a column to explain the matter, that the truth should be made known to the public.

That is a splendid idea.

Then, on behalf of the Federal Council Publicity Committee, he suggests the members should take every opportunity of making these facts known to patients.

May I suggest that it is completely unreal to rely on this method for the dissemination of information? The patients coming to private doctors not cooperating in the scheme are the members of the public least in need of this information. Further it is utterly impossible for even a reasonably busy doctor to take up the subject satisfactorily with every patient, or even with a substantial number. Even if he could, his explanations might not be consistently satisfactory and quite a number would resent having their consultation time used in this manner.

It can be, and in fact is, done with a few "key" patients.

An attractive placard in the waiting room can be read by all patients who are interested and those who wish can ask the doctor further questions.

The main problem of informing the public cannot be done through the consulting room, but is surely the precise function of the Publicity Committee.

Recently in Victoria, at any rate, there has been a notable improvement in keeping our point of view before the public, but I gather the people as a whole are still allowed to feel that we are being non-cooperative, negative and obstructive. It would greatly help our cause if we seized every opportunity to put our positive and constructive suggestions before the people and to point out how the Government is obstructing them and being non-cooperative.

Some may say that this is already being done, but my experience indicates that it has not yet been done enough to achieve the desired effect.

In this connexion, the method of refund advocated by the President of the New South Wales Central Southern Medical Association is a most excellent one and deserving of presentation to the Government and simultaneous full publicity.

Yours, etc.,

118 Canterbury Road,
Middle Park,
Victoria.
June 8, 1949.

A. MCQUEEN THOMSON.

SOME ASPECTS OF NUTRITION AS RELATED TO THE PRACTICE OF OBSTETRICS AND GYNÆCOLOGY.

SIR: I trust Dr. Hipsley will continue the investigations of magnesium in diets in pregnancy and gynæcology.

In an as yet unfinished series of cases I have found that magnesium gluconate does clinically relieve the conditions of premenstrual and menopausal "mental tension". Perhaps the older generation of physicians with their saline purge before menses and grandmother's "weekly dose of salts keeps the girls healthy and stops their tantrums" may be proven scientifically correct. Likewise magnesium seems to have a place in the muscular incoordination of delayed first stage labour.

Yours, etc.,

Melbourne,
June 17, 1949.

W. J. RAWLINGS.

A NATIONAL HEALTH SERVICE.

SIR: So we have come to the position where "Lang is right", or at least the Federal Council thinks so, since a reprint from Lang's *Century* is enclosed in our British Medical Association mail. However, on two minor points, among many major ones, Lang is quite wrong. Dr. McMeekin has never been "howled down by the workers at Broken Hill", nor was he, or anyone else, "run out of town at Bourke" during the recent Cobar by-election. This running out of town took place only in the fertile imaginations of a venal Press and of Mr. Lang.

Things have come to a sorry pass indeed when our Federal Council calls Mr. Lang to the rescue along with, in South Australia at least, the Bank Employees Committee. The distribution by the British Medical Association of such obvious political propaganda throws doubt on the claim that the issues are non-political, which, of course, no one but the naïve ever believed in any case.

There are very serious questions concerning its attitude to the organization of health services which are up for determination by the medical profession. Most of us, including the Federal Council, accept the necessity for, and inevitability of, organized health services. The main issue seems to be whether the medical profession is going to have its own way, dictate its terms according to its own ideas and apparent interests, or whether the governments are going to have the major say in such organization. I believe the latter is the essential and inevitable course, and that the medical profession is going to have the maximum beneficial influence on government schemes, the more

cooperatively we approach these matters. I assume, of course, that the profession is concerned to provide the best and most comprehensive possible preventive and therapeutic services for all the people.

I want to use the pharmaceutical benefits scheme as an example. What an apparent mess exists at present! Intensive experience of the "P.B.S." in use since its inception has shown me that it works well to the mutual advantage of my patients and myself without in any way overriding my right to treat patients according to my judgement. Even without the improvements lately announced, the scheme covers the great majority of pharmaceutical requirements and it involves no more clerical work than pre-"P.B.S." practice. From a medical-technical point of view, there can be no cogent objections to the scheme, although there is room for constant improvement. From the patients' viewpoint the scheme is obviously welcome, apart from a minute number—two in my own experience of several thousand patients—who are too "proud and independent" to accept what they have already paid for. They may be neglected in arguments. I know, too, from many discussions with fellow practitioners that many, possibly a majority, accept the idea of the scheme. Over a hundred doctors (not Mr. Lang's forty, and not more than twenty of them communists) have been using the scheme. Many others have wished to use it, but have felt that they should not in the face of the non-cooperation of the majority of doctors, most of them having no real knowledge of the scheme for the reason that they have not read the actual formulary and the accompanying explanation issued by the Commonwealth Health Department.

The Government has not seen fit to tell the people in a big way about the scheme and their right to their pharmaceutical requirements without further payment than they have already made in their social services taxation. Instead the people, and the majority of doctors with them, have heard of the scheme, in the main, only from bald government pronouncements or from statements of its opponents. Even so, it is worth noting that repeated Gallup polls have reported majorities in favour of the principles involved in the scheme.

We have arrived at the present situation where the Government, feeling that nothing more can come from continuing negotiations with the Federal Council, and with very little organized public support which it could use in argument with the British Medical Association, has now resorted to the measure of regulating that doctors shall use the official forms where their prescriptions come within the scope of the official formulary, so that patients can get their needs without paying for them twice over.

As much as I disagree with the Federal Council's attitude of non-cooperation, which has contributed mainly to the present situation, I also profoundly disagree with the Government's compulsory measures, which stem from the same political attitude as led it to refrain from enlightening and mobilizing the public and, incidentally, many of the doctors. However, I am sure that the way out of the morass lies in the doctors now using, as well as accepting, the formulary and the prescription forms. This action will serve the interests of our patients, who make up the people. It will place us in a much stronger position to influence the further inevitable development of health services. The present attitude merely isolates us from the people.

I propose that a referendum of doctors be held to determine just what proportion of our members are in favour of working the scheme, or otherwise. An essential preliminary to such a referendum would be the putting before all members of the case for working the scheme drawn up by those who have had experience of it so far, together with the answers to the arguments, often completely misleading and sometimes mendacious, to say the least, that have been raised against it.

Yours, etc.,

39 Torrens Road,
Cheltenham,
South Australia.
June 20, 1949.

ALAN FINGER.

SIR: The Socialist Government at Canberra has emphasized for months how much better the medical services will be in this country, when private medical practice has been replaced by a nationalized and regimented health service.

Abolition of private practice—and with it, of course, abolition of the privacy which exists (and always should exist) between doctor and patient—is the declared basis of Senator McKenna's national health service scheme (so-called).

It is staggering, therefore, to read the Commonwealth Health Department's current advertisement for a director of medical services at Canberra. Among various academic requirements for the position, the following is listed quite solemnly as "essential": "Wide experience in private practice."

Running true to form, and with characteristic inconsistency, the socialist is determined "to have his cake and eat it".

Yours, etc.,

189 Macquarie Street,
Sydney,
June 27, 1949.

CHARLES DE MONCHAUX.

CORONARY OCCLUSION.

SIR: Your correspondent in the journal of May 21, 1949, raises the question of the incidence of thrombosis in the coronary arteries in cases of coronary occlusion. He says that Wright-Smith, of Melbourne, in 1936 recorded 496 cases in which thrombosis occurred, and says that it would be interesting to know if Wright-Smith was wrong.

In the last 317 cases at the City Morgue, Melbourne, in which death was attributed by me to coronary insufficiency, coronary thrombosis was observed in 18 cases. In 124 cases of this series, infarction of the heart muscle had occurred, so that even if infarction of the heart muscle was made the diagnostic criterion of coronary occlusion, thrombosis would still be uncommon.

Coronary thrombosis is a rare event, but it is often assumed and it appears as a cause of death on many death certificates. Shennan in his "Post Mortems and Morbid Anatomy", 1912, made these remarks: "In adults the coronary arteries themselves are very commonly the seat of atheroma. Both vessels may be affected, but usually the condition is more marked in the left coronary artery, particularly in its descending branch. In rare cases the vessels may be completely occluded by thrombosis." It appears that Wright-Smith was probably right.

Yours, etc.,

City Morgue,
Melbourne,
June 23, 1949.

KEITH BOWDEN.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Numbers 40 and 42, of June 9 and 16, 1949.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA-GOING FORCES).

Appointments.—Albert Victor Morse is appointed Surgeon Lieutenant (for short service), dated 1st January, 1949. Charles Vaughan Phayre Ryall and James Dermott Villiers are appointed Surgeon Lieutenants (for short service), dated 1st March, 1949. Emlyn Owen and Russell David Frederick Teal are appointed Surgeon Lieutenants (D) (for short service), dated 10th March, 1949.

AUSTRALIAN MILITARY FORCES.

Royal Australian Army Medical Corps.

SX500729 Captain (Temporary Major) G. G. Wyllie relinquishes the temporary rank of Major and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (4th Military District), 6th April, 1949.

TX 16303 Captain (Temporary Major) K. L. Wise relinquishes the temporary rank of Major and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (2nd Military District), 29th March, 1949.

The following officers are transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (3rd Military District): Captains VX 700026 K. S. Fitzpatrick, 16th March, 1949, and VX700088 A. G. G. Carter, M.B.E., 11th March, 1949.

Australian Imperial Force.

Royal Australian Army Medical Corps.

VX14845 Lieutenant-Colonel (Temporary Colonel) N. M. Eadie, E.D., relinquishes the temporary rank of Colonel and is placed upon the Retired List (3rd Military District) with the rank of Lieutenant-Colonel and with permission to wear

the prescribed uniform, 24th July, 1946 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 196 of 1946, promulgated in *Commonwealth Gazette*, No. 200, of 1946).

Permanent Supernumerary List.

Royal Australian Army Medical Corps.—VX259 Lieutenant-Colonel (Temporary Colonel) E. E. Dunlop, O.B.E., relinquishes the temporary rank of Colonel and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (3rd Military District) with the honorary rank of Colonel, 2nd February, 1946 (in lieu of the notification respecting this officer which appeared in Executive Minute No. 104 of 1946, promulgated in *Commonwealth Gazette*, No. 86, of 1946).

The following officers are transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (2nd Military District): Lieutenant Colonels NX455 A. A. Moon, M.B.E., 12th January, 1946, and NX350 E. L. Corlette, M.B.E., 8th January, 1946 (in lieu of the notification respecting these officers which appeared in Executive Minute No. 94 of 1946, promulgated in *Commonwealth Gazette*, No. 82, of 1946).

To be Lieutenant-Colonels, 27th September, 1945.—Majors (Temporary Lieutenant-Colonels) NX455 A. A. Moon, M.B.E., and NX350 E. L. Corlette, M.B.E.

To be Majors, 5th August, 1941.—Captains (Temporary Majors) NX455 A. A. Moon, M.B.E., and NZ350 E. L. Corlette, M.B.E.

Citizen Military Forces.

Northern Command: First Military District.

Royal Australian Army Medical Corps.—1/21298 Captain R. Row is appointed from the Reserve of Officers with Regimental Seniority next after 1/10316 Captain H. W. A. Forbes, 17th March, 1949.

1/39016 Captain D. K. Lehmann is transferred to the Reserve of Officers (Royal Australian Army Medical Corps) (2nd Military District), 4th March, 1949.

Southern Command: Third Military District.

Royal Australian Army Medical Corps.—The following officers are appointed from the Reserve of Officers, with regimental seniority in accordance with Army seniority, 1st May, 1948: Majors 3/101804 T. P. Crankshaw, 3/101002 P. J. Parsons, 3/51004 H. V. Francis, M.B.E., 3/101007 R. Motteram, 3/51003 P. S. Woodruff and 3/101802 R. A. Douglas, and Captains 3/72793 I. A. N. McCallum, 3/114023 C. A. Jones, 3/77537 G. G. Harkness, 3/111027 E. J. C. Claridge, 3/92021 W. Rosenthal, 3/101005 T. D. Hollywood and 3/82030 J. C. F. Minnis. 3/63671 Major K. H. Heard is appointed from the Reserve of Officers, with regimental seniority in accordance with Army seniority, and is borne supernumerary to the authorized establishment of Majors with pay and allowances of Captain (at his own request), 1st May, 1948. 3/107675 Captain F. A. L. Bacon is appointed from the Retired List (3rd Military District), 1st May, 1948. *To be Captains (provisionally), 24th November*, 1948.—3/55218 James Best, 3/101805 Jack Philip Morris, 3/101004 Bryan Hudson, 3/101806 Geoffrey Maxwell Stubbs, 3/101006 John Joseph McCarthy and 3/87148 William Lewis Jenkins.

Southern Command: Fourth Military District.

Royal Australian Army Medical Corps.—4/31944 Captain G. G. Wyllie is appointed from the Reserve of Officers, with regimental seniority next after 4/31908 Captain J. S. Skipper, 7th April, 1949.

Western Command: Fifth Military District.

Royal Australian Army Medical Corps.—5/26397 Captain (provisionally) W. I. Gordon is seconded whilst undergoing post-graduate studies in the United Kingdom, 1st March, 1949. 5/10586 Honorary Captain N. H. M. Colyer is appointed from the Reserve of Officers, and to be Captain (provisionally), 22nd March, 1949.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

2nd Military District.—The following officers are placed upon the Retired List (2nd Military District) with permission to retain their rank and wear the prescribed uniform: Major P. G. Heffernan, 4th March, 1949, and Lieutenant S. B. Paul, 1st April, 1949.

Captain D. A. Selby is retired at her own request, 10th March, 1949.

4th Military District.—To be Honorary Lieutenant, 7th March, 1949: Geoffrey Reginald Bailey.

6th Military District.—Lieutenant-Colonel B. M. Carruthers, O.B.E., is placed upon the Retired List (6th Military District) with permission to retain his rank and wear the prescribed uniform, 19th March, 1948.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

Squadron Leader L. R. Trudinger (257718) ceases to hold the acting rank of Wing Commander, 26th April, 1949.

Reserve: Medical Branch.

The following former officers are appointed to commissions with the temporary rank of Squadron Leader: Leslie Kowadlo (257662), 8th December, 1948, Harris Phillip Greenberg (267761), 15th January, 1949.

The Royal Australasian College of Physicians.

ELEVENTH ANNUAL MEETING.

THE eleventh annual meeting of the Royal Australasian College of Physicians was held in Sydney on Thursday and Friday, May 26 and 27, 1949.

Admission of Fellow.

At the meeting of the general body of Fellows, Dr. E. S. J. King, pathologist at the Royal Melbourne Hospital, was elected a Fellow of the College under article 40 of the articles of association, which provides for nomination by the Council for election as Fellows of such persons as have in the opinion of the Council sufficiently distinguished themselves in any branch of medical science or internal medicine.

Admission of Members.

The following candidates, who were successful at examinations held in Australia and New Zealand, were admitted to membership of the College in Sydney on Thursday, May 26, 1949: Dr. I. S. Collins, Dr. A. B. Conomy, Dr. R. L. Harris, Dr. J. G. Radford, Dr. John Raftos and Dr. L. R. Rail, of New South Wales; Dr. J. G. Hiller, Dr. Bryan Hudson, Dr. J. S. Menzies, Dr. D. B. Pitt, Dr. C. E. Sawrey, Dr. H. B. Taft and Dr. Allan Wynn, of Victoria; Dr. D. Kerr Grant, of South Australia; Dr. W. J. E. Phillips, of Western Australia; Dr. A. J. M. Dobson, of Tasmania; and Dr. C. H. Baird, Dr. R. A. Barker, Dr. Peter Bartley, Dr. R. C. S. Dick, Dr. S. G. Faris, Dr. Stewart Hunter, Dr. D. S. Malcolm, Dr. Margaret Neave, Dr. C. P. Powles and Dr. J. D. Willis, of New Zealand.

Obituary.

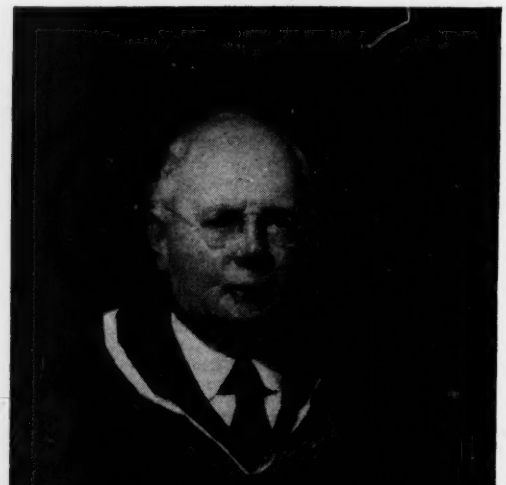
CRAWFORD HENRY MOLLISON.

WE are indebted to Sir John Newman Morris for the following appreciation of the late Dr. Crawford Henry Mollison.

Crawford Henry Mollison died in Melbourne in his eighty-sixth year on April 6, 1949, thus closing a unique medical career in the State of Victoria. He came from a pioneer family of brothers, his father, Crawford Mollison, and his uncle, William, having arrived in the State in 1835. Crawford Henry Mollison was born on August 1, 1863, at Bendigo, Victoria, where his father was police magistrate in the early gold mining period of that now important provincial city. In 1871, at the age of eight years, Mollison was sent to England in a "windjammer" and went to school at Tunbridge Wells. His uncle, Alexander Mollison, also a pioneer settler in the State, brought Mollison back to Victoria, and he continued his schooling at Kew High School. Later he went to Geelong Grammar School for two years, and finally matriculated from the Melbourne Grammar School.

He proceeded to the Medical School at the University of Melbourne, and graduated as Bachelor of Medicine and Bachelor of Surgery in 1885. He displayed, in his student days, those qualities which distinguished him all through his long and useful life. He came under the influence of a remarkably fine group of teachers in the Medical School, men who laid the foundation of medical education in Melbourne

on a sound and sure basis, and whose names should never be forgotten. They were such leaders as H. B. Allen, John Williams, T. N. Fitzgerald, E. M. James, Girdlestone and S. D. Bird. All of these and others besides testified to the excellent qualities of the young student, C. H. Mollison, who gained honours in four of the five years of his university course, and who graduated with the highest honours given in his final year, winning the final year scholarship. As a student he was declared to have been always remarkable for his industry and intelligence. His seniors also noted his invariable good temper, his gentlemanly behaviour, and his kind and considerate attitude in the wards and to the patients. For two years after he graduated he served as resident medical officer at the old Melbourne Hospital, after which he returned to England for a period. In 1887 he became a member of the Royal College of Surgeons of England. He spent seven months in Vienna, studying dermatology at the Polyclinic under Hebra. Hebra certified to the diligent attendance of Mollison at the out-patients' department, during which "he had great opportunity and advantage of studying the various diseases of the skin and



the different kinds of syphilitic eruptions, and of becoming acquainted with the mode of treatment which is carried out here". Mollison, at that time, had the intention of practising as a specialist in dermatology; it was fortunate for medico-legal interests that he abandoned that intention. On his return to Melbourne he entered into partnership in the general practice of the late Dr. Cam. White at Balaclava, and remained there until 1891, when he sold out.

From that time until his retirement some two years before his death, Mollison devoted his great abilities to the field of forensic medicine, in which he held a supreme position for fifty-five years. In 1893 he was appointed to the position of Coroner's Surgeon, and in the same year he became an examiner in forensic medicine and psychological medicine at the University of Melbourne. In 1905 he became Lecturer in Forensic Medicine. He achieved fame as a medical witness, appearing in many famous criminal trials. No advocate was ever successful in moving Mollison away from factual evidence. In some legal circles he became known as "non-committal Mollie". A former Chief Justice of the Supreme Court of Victoria, Sir Frederick Mann, described him to the writer thus: "Dr. Mollison earned the admiration of the Judges by the way in which he gave evidence of the facts disclosed by the autopsies he had made." As Government Pathologist, Mollison was associated with a succession of coroners, all of whom placed great reliance on his judgement, and the present coroner in Melbourne pays his own tribute and his predecessors' tribute to his skill and accuracy of observation.

Dr. Mollison served for many years as pathologist to the Royal Melbourne, the Women's and the Children's Hospitals. He became assistant pathologist to the Melbourne Hospital in 1889, and very soon after that date became associated with the pathological departments of the other hospitals mentioned. He did an immense amount of work in private practice as a pathologist, and indeed was for many years the final court of appeal in macroscopic and microscopic pathological problems. Here he showed the same degree of careful accuracy in giving opinions, and the same willingness to help private practitioners in giving prompt and painstaking attention to matters referred to him.

In 1931 the Medico-Legal Society of Victoria was formed, and it was decided that the president should be alternately a lawyer and a doctor. The first president was the late Mr. Justice (Sir Stewart) McArthur, and by unanimous choice Dr. Mollison was the first medical vice-president, becoming president the following year. In 1935 he delighted the members of the society with an address on "Some Medico-Legal Reminiscences".

Mollison's services in the medical profession were outstanding. He became treasurer of the Medical Society of Victoria in 1891, continuing in that office on the amalgamation in 1908 of this society with the Victorian Branch of the British Medical Association. His length of service probably constitutes a record, for on his retirement in 1947 he had held office for fifty-five years, scrupulously caring for the funds of the Branch, and, as trustee, managing the various trust funds. For the first twenty-two years of operations of the British Medical Insurance Company of Victoria, he was chairman of directors, and played the major part in establishing this company on its present firm basis. He held a similar position with the British Medical Agency of Victoria. For very many years Dr. Mollison was a member of the Medical Board of Victoria, acting as its president for the last six years until his retirement.

Dr. Mollison, although he was of such a quiet retiring nature, enjoyed the company of his large circle of friends. He was a regular member of a bridge four which met each week at the homes of the players. His interest in sport was keen; in 1890 he became surgeon to the Victoria Racing Club, and until he health failed two years ago he never missed a Melbourne Cup meeting. He loved cricket, and attended all the important matches played on the Melbourne Cricket Ground. He excelled in the game of royal tennis, winning on several occasions the gold racquet and the silver racquet of the Royal Melbourne Tennis Club. Regularly every Sunday he played lawn tennis in which he also excelled.

This modest, delightful man, with his rosy cheeks, pleasant smile, and soft voice, was beloved by all who knew him and worked with him over two generations. Scrupulously fair in all things, he was level-headed, firm and courteous, and a shrewd judge of character. He was punctilious in the discharge of any duty which he undertook. It was a real pleasure to know him and work with him. He resolutely declined the wish of the Victorian Branch Council to assume the office of President of the Branch. On the occasion of his jubilee as Branch treasurer, his portrait was painted as a presentation to him, and the Federal Council awarded him the rare distinction of its gold medal.

More recently, on his retirement from the position of pathologist to the Women's Hospital, on the initiative of the medical staff of that institution, a fund was created for the purpose of founding a Crawford Henry Mollison Prize in Forensic Medicine.

These honours from his professional colleagues, arranged and awarded in his lifetime, gave him great, but quietly expressed, pleasure.

It is difficult to sum up the qualities of this truly great man, great in his own sphere of medical work, and in his meticulous devotion to his chosen profession. Although his medico-legal work forced him into publicity, he never sought the limelight. His greatness was that of quietness and of simplicity, and his contributions to the ends of justice, and the welfare of his fellows, were unique.

The Council of the Victorian Branch of the British Medical Association, which owed so much to him, recorded his services thus:

> That the Council of the Victorian Branch of the British Medical Association records with profound regret the death of Crawford Henry Mollison, M.B., Ch.B., M.R.C.S., on April 6th, 1949, at the age of eighty-five years. As a practising Pathologist and Government Pathologist, as a lecturer in Forensic Medicine in the University of Melbourne, and as President of the Medical Board of Victoria, Dr. Mollison rendered distinguished public service, while his services to the medical profession as a member of

the Branch Council, as a Trustee of the Medical Society of Victoria and Honorary Treasurer for over fifty years, as Chairman of Directors of the British Medical Agency of Victoria and of the British Medical Insurance Company of Victoria, will long be remembered.

To his widow and surviving children the fullest sympathy from an admiring and grateful profession is offered, and the hope is expressed that memory of a great life will afford some consolation in the loss that has been sustained.

Mr. A. C. Tingate writes: During ten years as City Coroner it was my privilege to know and work with Dr. Mollison. He was kindly, courteous, every ready to help and advise, a true gentleman and a sincere friend. The consultations which were held with him nearly every day were invariably a source of instruction and pleasure.

Dr. Mollison was associated with the Coroner's Office from 1891 until 1947—fifty-six years. In that long period he performed countless autopsies for many coroners and was a highly important witness in numerous murder and other criminal trials, including the Deeming case in 1895, the well-known "Pyjama Girl" case in 1944 and many others.

His vast medico-legal knowledge was everywhere recognized and his opinion valued and respected. When Dr. Mollison expressed an opinion he was always prepared to give reasons for his view. His evidence was hotly attacked by counsel at times and he said on one occasion that he had had the doubtful pleasure of having been cross-examined by all the eminent criminal counsel of his time. He added that, being naturally of a forgiving nature, he bore no malice either for what they said to him in the box or for what (he hoped) they thought they were justified in saying in the interests of the accused about his evidence when addressing the jury afterwards.

Dr. Mollison was a model witness. He gave evidence clearly and concisely and was at all times scrupulously fair, remaining calm, and refusing to be hurried into giving an answer. All the facts as he knew them, whether favourable or otherwise, were placed before the court. He was a keen observer and it seemed as if nothing escaped him. He emphasized that he was an independent examiner; he was not acting in the interests of the police or of any party, but was there as the instance of the coroner to find all relevant facts, to set them out fully and, as an expert, to give opinions when asked.

It is indeed gratifying to have this opportunity of expressing appreciation of one who was a great leader in his profession and who gave such outstanding service to the State as a medico-legal pathologist of the highest order.

Dr. A. Norman McArthur writes: I think it was probably in 1889, 1890, 1891 and 1892 that I was a medical student, and on certain days would go to the mortuary at the Melbourne Hospital and hear Professor Allen give a general lecture on pathology. When he had finished we who were keen would go into the mortuary and see Dr. Crawford Mollison at work on a cadaver. In his grumpy diction (he was not a grumpy) he would demonstrate his pathological findings, which was all extremely interesting. It was the practical demonstration that carried more knowledge than the discursive lecture by Professor Allen. Every organ would be demonstrated—kidneys, pancreas, liver, lungs and heart, and the brain. He adored the operations on the cadaver, and would tell us that they were extremely interesting and produced no danger as seen in surgery. He was very quiet and undemonstrative and was greatly admired by the students. "Mollie", as we called him, played tennis, and Dr. Thomas Naghten Fitzgerald had a tennis court at his home. It was cramped for players, with not a great deal of movement around the court. The usual players at that time were "Mollie", Dick Stawell and Jeff Wood. Dr. T. N. (later Sir Thomas) Fitzgerald's house and private hospital were in Lonsdale Street opposite the law courts.

Later in life I found "Mollie" was treasurer, president *et cetera* of the Royal Tennis Club and for many years was the champion Royal Tennis player. There were only two Royal Tennis courts in Australia, one at Hobart and one in Exhibition Street, Melbourne.

As my work in gynæcology increased, I had many patients sent from Tasmania and Western Australia for removal of a tumour, most commonly of the breast. In all cases complete removal had been advised when there was doubt about the malignancy. "Mollie" would be with me with all equipment—microscope, microtome and agents. I would hand over the tumour to him, and often the result of his investiga-

DISEASES NOTIFIABLE IN EACH STATE AND TERRITORY OF AUSTRALIA AND NOTIFICATIONS FOR THE WEEK ENDED JUNE 18, 1949.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.[2]	Australian Capital Territory.	Australia.[3]
Ankylostomiasis	*	5	..	..	1	..	..	..	6
Anthrax	*	*	*	*	*	*	..	*	..
Beriberi	*	*	*	*	*	*	..	..	..
Bilharziasis	*	..	..	..	..	..	..	..	..
Cerebro-spinal Meningitis	1	2	1	..	1	..	..	..	5
Cholera	*	*	*	*	*	*	*	*	..
Coastal Fever(*a*)	*	*	*	*	*	*	..	*	..
Dengue	*	*	*	*	*	*	..	*	..
Diarrhœa (Infantile)	..	..	2	..	..	..	..	..	2
Diphtheria	9	13	7	..	5	1	..	..	35
Dysentery(*b*)	..	2	1	..	..	..	..	2	5
Encephalitis Lethargica	..	..	1	..	..	..	..	..	1
Erysipelas	*	*	*	1	*	*	..	..	1
Filariasis	*	..	..	..	..	..	..	..	..
Helminthiasis	*	..	*	*	*	*	*	*	..
Hydatid	*	1	*	*	..	*	*	..	1
Influenza	*	*	*	..	*	*	..	*	..
Leprosy	..	..	..	..	..	..	..	..	..
Malaria(*c*)	*	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)
Measles	*	*	*	71	*	*	..	..	71
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	2	10	..	..	..	..	..	..	12
Psittacosis	*	..	*	..	*	*	*	*	..
Puerperal Fever	..	..	2	..	..	..	..	..	2
Rubella	*	*	*	*	*	*	..	..	..
Scarlet Fever	24	25	9	8	2	..	..	1	69
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	*	..	2	*	*	*	*	*	2
Trachoma	*	..	*	*	*	*	*	*	..
Tuberculosis(*d*)	11	9	16	5	8	6	..	..	55
Typhoid Fever(*e*)	..	..	..	1	..	..	..	..	1
Typhus (Endemic)(*f*)	1	..	..	..	2	..	..	..	3
Undulant Fever	1	1	1	..	..	..	..	..	3
Weil's Disease(*g*)	*	*	..	*	*	*	*	*	..
Whooping Cough	*	*	*	35	*	*	..	..	35
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 36, 1944-1945.
[2] Figures not available.
[3] Figures incomplete owing to absence of returns from Northern Territory.
* Not notifiable.
(*a*) Includes "Mossman" and "Sarina" fevers. (*b*) Includes amœbic and bacillary. (*c*) Statistics inexact with varying practice with regard to relapses in Service cases infected overseas. (*d*) Includes all forms except in New South Wales and Northern Territory, where only pulmonary tuberculosis is notifiable. (*e*) Includes enteric fever and paratyphoid fevers. (*f*) Cases reported are all of the mild type known as Brill's disease or endemic typhus (including scrub and urban types). (*g*) Includes leptospiroses, Weil's and para-Weil's disease.

tion was "simple tumour". I know that seven patients were saved the exacting operation of complete removal of breasts, muscles and glands. Other pathologists would not accede to my request for investigation; they could not do it in under an hour. He was really a wonderful pathologist. In later years I saw his life fading away and often met him at his rooms in 41 Spring Street. All people in those professional rooms dearly loved the old and failing man.

Post-Graduate Work.

SEMINARS AT ROYAL PRINCE ALFRED HOSPITAL.

THE following seminars will be held at Royal Prince Alfred Hospital, Camperdown, New South Wales, on Friday afternoons in July and August, 1949. Each seminar will be held in the A2 lecture theatre, between 1.15 p.m. and 2.15 p.m., and will be followed by a pathological demonstration, staff rounds and, at 4.15 p.m., grand rounds at Professor Lambie's department (Atherden lecture theatre). All members of the medical profession are invited to attend.

July 15: "Meningitis"; July 22: "Tuberculous Pleural Effusions"; July 29: "Cardiac Catheterization"; August 5: "Recent Advances in Biochemistry", Dr. Lee Day; August 12: "Polycythæmia"; August 19: "Helminth Infections of the Bowel"; August 26: Journal Club (Neurology Group).

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Moloney, Noreen Loreto, M.B., B.S., 1948 (Univ. Sydney), Emeralda, Junee, New South Wales.

Sinclair, Bruce Alexander, M.B., B.S., 1947 (Univ. Sydney), 14 Carabella Street, Kirribilli.

Medical Appointments.

Dr. G. H. Burnell, Dr. I. B. Jose, Dr. J. L. Eustace, Dr. R. E. Magarey, Dr. G. A. Lendon and Dr. K. S. Hetzel have been appointed members of the Advisory Committee under the provisions of the *Hospitals Act*, 1934-1941, of South Australia.

Australian Medical Board Proceedings.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts*, 1939 to 1948, of Queensland, as duly qualified medical practitioners:

Ewart, Charles Colin, M.B., B.S., 1942 (Univ. Sydney), M.R.C.P., 1948 (London), 51 Elimatta Drive, Ashgrove, Brisbane.

McFarland, Dorothy, M.B., B.S., 1946 (Univ. Sydney), Brisbane General Hospital, Brisbane.

Archer, Keith, M.B., B.S., 1946 (Univ. Melbourne), Hospitals Board, Innisfail.

Emery, Warren Frederick, M.B., B.S., 1946 (Univ. Adelaide), Hospitals Board, Townsville.

The following additional qualification has been registered:

Moore, Geoffrey Henry, General Hospital, Townsville, F.R.C.S. (Edinburgh), 1939.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Wilson, Chester Gilmore, M.B., B.S., 1944 (Univ. Queensland), Royal Hobart Hospital, Hobart.

Hodgson, John Hargraves, M.B., B.S., 1947 (Univ. Sydney), Launceston General Hospital, Launceston.

The following additional qualification has been registered:

Boscence, William Edward Bruce, F.R.C.S., 1949.

Diary for the Month.

JULY 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee. Organization and Science Committee.
JULY 14.—Victorian Branch, B.M.A.: Organization Subcommittee.
JULY 18.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
JULY 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JULY 20.—Western Australian Branch, B.M.A.: General Meeting.
JULY 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
JULY 21.—Victorian Branch, B.M.A.: Executive Meeting.
JULY 22.—Queensland Branch, B.M.A.: Council Meeting.
JULY 26.—New South Wales Branch, B.M.A.: Ethics Committee.
JULY 27.—Victorian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

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